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A COMPARATIVE STUDY OF SOME CHARACTERISTICS IN ACHIEVERS AND NONACHIEVERS AMONG CHILDREN WITH RETARDED MENTAL DEVELOPMENT.
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THE DESIGN OF THIS STUDY WAS TO DISCOVER BEHAVIOR CHARACTERISTICS AMONG THE ACHIEVERS AND UNDERACHIEVERS AMONG MENTALLY RETARDED CHILDREN WHICH WILL DIFFERENTIATE BETWEEN THEM FOR PREDICTIVE PURPOSES IN THE DEVELOPMENT OF CURRICULUMS. THE MAJOR OBJECTIVES WERE TO ESTABLISH (1) PATTERNS OF DEVELOPMENTAL BEHAVIOR IN CHILDREN WITH RETARDED MENTAL DEVELOPMENT, (2) SOME BEHAVIORAL CHARACTERISTICS IN BETTER AND POORER LEARNERS WHO ARE MENTALLY RETARDED WHICH COULD AID THE CLINICIAN IN DIAGNOSIS, PROGNOSIS, AND REMEDIATION, AND (3) PREVENTIVE MEASURES IN WHICH TO COMBAT THE ADVENT OF SUCH BEHAVIORS. THE RESULTS OF THIS INVESTIGATION STRONGLY RECOMMEND THE IMPERATIVE NEED FOR THE ESTABLISHMENT OF AGENCIES TO PROVIDE EARLY EDUCATION, COUNSELING, AND GUIDANCE FOR PARENTS OF MENTALLY RETARDED CHILDREN. BY SUCH A PROCESS IT MAY BE POSSIBLE TO STRUCTURE A SATISFACTORY EMOTIONAL CLIMATE IN THE HOME CONDUCIVE TO THE DEVELOPMENT OF SATISFACTORY CHILD-PARENT RELATIONSHIPS AND CONSEQUENTLY PREVENT EARLY DISTURBING EMOTIONAL EXPERIENCES. THROUGH THIS MEANS, ALSO, THE PARENTS MAY HAVE AN OPPORTUNITY TO WORK OUT AN ACCEPTABLE RELATIONSHIP BOTH WITH THE CHILD AND OTHER IMPORTANT PEOPLE IN THE CHILD'S ENVIRONMENT. (JL)

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A COMPARATIVE STUDY OF SOME CHARACTERISTICS IN ACHIEVERS AND NON-ACHIEVERS AMONG CHILDREN WITH RETARDED MENTAL DEVELOPEMENT

December 1, 1956 - February 28, 1958

Louis M. Di Carlo, Project Director

SYRACUSE UNIVERSITY RESEARCH INSTITUTE

OFFICE OF RESEARCH IN SPECIAL EDUCATION

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L.M.D.C.

PREFACE

Psychiatry has long accepted the basic principle that disparity between an individual's potentials and achievement levels represents symptomatic behavior in a maladjustment constellation. The inability to derive satisfaction from the optimum exercise of one's capacities lowers an individual's efficiency and may abort fulfillment of intellectual, educational, and psychological needs through accepted channels. Under such conditions, the individual usually learns compensatory adjustmental behavior to preserve integrity and self-respect. These mechanisms become forged together in a concatenation of tension-reducing behavior patterns.

This research proposed to investigate and analyze basic phenomena for such discrepancies as learning behavior of a group of achievers and non-achievers among children with retarded mental development. Such a study required a ~~multi-prong~~ attack investigating intellectual, educational, psychological, and sociological variables. A psychologist, an audiologist-speech pathologist, and a social worker contributed their skills to an integrated approach in this research. ~~The talents and skills of many other specialties were also utilized.~~ The planning and the design of the project proved ambitious. From the very beginning the realization that retarded mental development is not one simple, single, clinical, or pathological entity became poignantly apparent. Moreover, a series of unmitigated exigencies provided resistance to the progress of the study. First, what appeared to be a simple routine task of selecting fifty achievers and fifty non-achievers required a pool of over two hundred children before proper selection could be completed. Preliminary testing revealed that many children had to be rejected because they did not meet the selection criteria. Second, time also became a most implacable variable. Third, financial restriction proved to be another insurmountable obstacle. Since the investigation explores so many aspects and different variables, the data already accumulated can easily occupy five additional years for study and analysis. The implication strongly suggests the study be continued. A great deal of normative data may be compiled by additional study. In addition to the one hundred Rorschach tests, one hundred Draw-A-Person, Draw-A-Man, and Bender-Gestalt tests were administered. The data also embraces numerous longitudinal interviews pregnant with a vast amount of useful and vital information which would contribute to a more adequate and dynamic understanding of basic behavior.

L.M.D.C.

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CHAPTER I

INTRODUCTION

A series of complex and difficult educational problems face the modern educator. Shortages of adequate school facilities and classroom space, insufficient numbers of trained personnel, continual and accelerated pupil enrollment complicate the planning and implementation of proper educational programs. Consequently, classrooms have become overcrowded with heterogenous student populations. The average teacher must structure lesson plans for groups of children who vary widely in range of intellectual endowment, educational abilities, and experiences, and who also differ in over-all as well as specific levels of school achievement.

These general inadequacies of our educational structure are reflected in many areas of special education and specifically in that area responsible for the instruction of educable mentally retarded children (7). The establishment of public school special classes for retarded children evolved from the concept of meeting the child's needs, needs which were not met because the students were not homogeneously selected for instruction. But, the selection of pupils for these classes did not continue consistently, for many children with personality and educational disabilities innocuously infiltrated them, and subsequently these classrooms became crucibles for non-mentally retarded children with personality and educational disabilities and behavioral deviations.

Parents' desire to educate their mentally retarded children in non-institutionalized educational facilities is not a new phenomenon. But, only within the last few years have parents and other interested individuals organized themselves at local, state, and national levels with the expressed objectives of securing implementation of educational provisions for non-institutionalized mentally retarded children. A precipitating factor for this movement was, and still is, dissatisfaction with existing educational facilities for these children (77).

Among the many problems in the education of these children in public school special classes, few are more important than the development of adequate verbal communication. Research (13) is unequivocal in emphasizing the relationship between adequate verbal communication and personality adjustment for normal children. If inadequate verbal communication handicaps the normal child, it will handicap the mentally retarded child more severely, particularly in the adjustment process. Adequate communication permits the child to express himself become part of the social group, relate to his peers and authority, and to develop a perception of the permissions and prohibitions of his mores. Speech and language provide the basic artery for the acquisition of knowledge, and they facilitate and expedite learning and manipulating symbolic behavior. Psychologists (37, 40, 46) have emphasized the contingent interrelationships between speech and language and the thinking process.

Research (10, 50, 93) has revealed that mentally retarded children are less efficient in communication. The investigation of any methodology that would result in the improvement of communication of mentally retarded children is highly desirable. Research (40, 46) also indicates that mentally retarded children present varying degrees of language disabilities, but the non-achieving mentally retarded children might be expected to be more handicapped in communication. Slower development of language and more bizarre language errors hindering communication may be the language correlates of under-achievement in the classroom.

The prosecution of such a project requires many talents and skills including a director, clinical psychologist, audiologist and speech pathologist, and social worker.

Since social casework methodology provides a unique opportunity for individualizing understanding, the advisability of having the social worker interview the parents and all other related individuals suggested itself. The possible anxieties that may have persisted among some families who permitted their children to participate in this investigation had to be dissipated. Moreover, it seemed reasonable that the social worker should conclude the investigation by removing any uncertainty and doubts, but more important to ascertain whether all individuals involved in the project were adequately oriented to its nature and objectives. The social worker was delegated with this responsibility (51). Even though the full knowledge of the objectives of this study had been imparted to the parents and although they consented to participate, the social worker's visits proved to be an important catalyzing agent in the alleviation of doubts, uncertainties, and parental emotions.

Concomitant with the recent developments in the education of mentally retarded children, persistent consideration of the influence of parental attitudes and environment upon the social adjustment affecting the school training has manifested itself with agitated turbulency (17, 41 42, 45, 77, 97, 99). Vaughn (97) not only expressed concern with the retarded educational functioning of the mentally retarded child, lack of knowledge of social and cultural factors as they affect this performance, but also the appalling dearth of trained social workers interested and available to function in this area.

The psychologist's responsibility in the conduct of this project included determining:

1. the mental age and intelligence quotient of each child on verbal and non-verbal intelligence tests;
2. the total educational achievement as well as specific areas of achievement;
3. personality characteristics;
4. psychomotor functioning;
5. The Primary Mental Abilities.

The audiologist and speech pathologist evaluated the processes involved in the development of communication. The tasks tested embraced auditory and visual skills, the oral and peripheral speech mechanism, muscular control for speech, articulatory proficiency, and complexity of grammatical structure. Specifically, the following language variables were investigated:

1. mean length of response;
2. number of incomplete responses, functionally complete but structurally incomplete responses, and complete responses;
3. number of sentences which are elaborated in comparison with simple sentences;
4. one-word responses;
5. proportions of parts of speech to total words used;
6. the total number and nature of grammatical errors.

The social worker's participation was devoted to collecting the following data for analysis:

1. The Vineland Social Maturity Scale,
2. parental factors:
    a. age and education of the parents,
    b. socio-economic status,
    c. traumatic effects of moving on social adjustment,
    d. mother's health during pregnancy,
    e. awareness of and attitude toward mental retardation,
    f. agreement of parents on child's management,
    g. parents' attitude toward siblings,
    h. aspirations of parents for child,
    i. effect of retardation on social life of parents.
3. the child:
    a. type of birth or injury,
    b. motor and speech development,
    c. illnesses,

   d. physical stigmata,
   e. nervous mannerisms,
   f. fears,
   g. behavioral deviations,
   h. identification with parent,
   i. pre-school experience,
   j. number of years attended school and school attendance,
   k. child's attitude toward school.

4. teacher about the child:
   a. rating of child,
   b. best subject,
   c. learning disabilities,
   d. school achievement,
   e. aptitude of child,
   f. teacher rating of parent as accepting or rejecting.

Analysis and evaluation of this data should provide information dealing with:

1. the effect of pre-school training upon the performance of the two groups;
2. the effect of intensive language, speech, and communication training before school entrance;
3. difference with respect to physical characteristics, previous illnesses, and other factors in early childhood;
4. the effect of emotional blunting experiences upon later behavior.

The study suggested the following hypotheses:

Psychologist

H_1: The Vocabulary subtest of the Stanford-Binet Intelligence Scale will not differentiate achievers from non-achievers.

H_2: Achievers' performance on the performance tests of intelligence will be better than that of non-achievers.

H_3: The total Bender Gestalt Motor Test will not differentiate achievers and non-achievers, but the sub-categories may reveal differences between the two groups.

H_4: The tests of verbal abstraction on the SRA Primary Mental Abilities Scale will differentiate achievers from non-achievers.

Audiologist and Speech Pathologist

H_5: The entire group of retardates will show difficulty in auditory recognition, auditory memory, following simple directions, following a story, and re-telling a story.

H_6: The achieving mentally retarded child will be superior to the non-achieving mentally retarded child in visual recognition of pictures, letters, numbers, sentences, and words within sentences.

H_7: All the mentally retarded children in the study will show a developmental lag in articulatory proficiency.

H_8: The achieving mentally retarded child will be superior to the non-achieving mentally retarded child in mean length of response, number of incomplete sentences, existence of elaboration, one-word responses, proportions of parts of speech to total words used, and in the total number and nature of grammatical errors.

Social Worker

H_9: The Vineland Social Maturity Social Quotient will show differences between achievers and non-achievers.

H_{10}: The achievers will be children from families with higher socio-economic status and more education than the non-achievers.

H_{11}: The achievers will be physically superior to non-achievers both at birth and in subsequent motor development.

H_{12}: The achievers will have fewer illnesses and accidents than non-achievers.

H_{13}: Achievers will have less nervous mannerisms and behavioral deviations than non-achievers.

H_{14}: Achievers will show more positive identifications than non-achievers.

H_{15}: Parental attitudes toward retardation will differentiate achievers from non-achievers.

H_{16}: Achievers will have fewer early emotional blunting experiences than will non-achievers.

The scope of this research is theoretically unlimited, but empirical and operational necessities, time, and other factors impose unavoidable limits. These limits are reflected in the arbitrary selection of the behavioral patterns and the methodologies employed.

CHAPTER II

REVIEW OF THE LITERATURE

Psychology

Although no dearth of research exists with respect to mentally retarded children, most of this research has concerned itself with differential diagnosis, analysis of the sub-categories, etiological factors, and chemopsychotherapeutic applications (6, 11, 54, 55, 58, 66, 72, 87, 102). Most of these findings will not be evaluated since they are not pertinent to this study. A very careful review of the literature discloses few, if any, projects involving factors affecting achievement among educable non-institutionalized mentally retarded children. Nevertheless, that literature concerned with non-retarded populations relevant to this experiment will be reviewed:

1. mentally retarded children;
    - a. studies employing intelligence (verbal and non-verbal) and achievement tests related to any aspect of the present investigation;
    - b. investigations employing personality tests to explore emotional factors;
2. similar experiments utilizing normal populations;
    - a. investigation of personality factors and employment of tests of personality measurement with achieving and non-achieving subjects;
    - b. exploration of factors affecting achievement using intelligence, Primary Mental Abilities, and achievement measures.

Studies Employing Intelligence (Verbal and Non-Verbal) and Achievement Tests

Bensberg (12) investigated the academic status of 274 male and 230 female institutionalized mentally defective subjects in an attempt to determine variables which might influence achievement. He administered the Revised Stanford-Binet and the American School Achievement Test to his subjects and matched them on the basis of chronological and mental ages. The females achieved significantly higher than the males. He also reported no significant differences between achievement of the subjects who had attended the institution for five years or more and those who had attended public schools prior to commitment. Examination of the design reveals no mention of the subjects' ages at the time of commitment. The chronological age at which a child entered the institution may be an important factor in determining his academic status. Two individuals may be included in the same experimental group because they have been institutionalized for five years or longer. One subject may have entered the institution at the age of 7, the other when he was 12 years old. The two have had radically different environmental and educational experiences. It is obvious, then, that if the variable of chronological age at the time of commitment is not accounted for, results obtained may not be accurate. Patterson and Phillelo (69) investigated the academic achievement of institutionalized mentally retarded subjects and reported that the boys tend to do better than the girls in arithmetic, while girls tend to do better in reading and spelling. In a continuation of their study they indicated an inability to make generalizations on the basis of a selection of a heterogeneous population and uncontrolled experimental design. Beverly and Bensberg (14) administered the Leiter International Scale, the Revised Stanford-Binet, Form L, and the Cornell-Coxe to 50 institutionalized mentally retarded subjects between 6 years 11 months to 16 years 2 months. The correlation between the Binet and the Leiter was .621; the Leiter and Cornell-Coxe, .818; the Binet and Cornell-Coxe, .670. Examination of the correlation coefficients reveals that a correlation of .818 between the Leiter and Cornell-Coxe is much higher than between the other tests. It would appear that the Leiter and Cornell-Coxe measure the different tasks more efficiently, and also since both are performance tests the correlation might be expected to be higher. In view of the placement of the subjects with respect to the Binet, another interpretation is possible. The correlation coefficient between the Leiter and the Cornell-Coxe may be reflecting the rank order of the subjects rather than agreement between the tests. The authors suggest that the norms on the Leiter lack some adequacy.

Carlton (23) investigated the effect of chronological age on the Revised Stanford-Binet on vocabulary score at the moron and imbecile levels. He reported that when mental age was held constant, various chronological age groups still differed significantly with respect to vocabulary score. He concluded that chronological age as well as mental age must be regarded significantly as contributing to the vocabulary score. Birch (15) administered the Goodenough Draw-A-Man and the Stanford-Binet to a group of borderline mentally retarded subjects between 10 years 6 months and 16 years 3 months. He suggested the Goodenough Test to be a valid test of mental ability among children between the mental ages 3-0 and 10-0, and Binet intelligence quotients of 70 or lower. He further indicated that the Draw-A-Man provided a valuable nonverbal test in a battery. In addition, he felt that the Goodenough offered opportunity for study of processes in concept development. Barcellos (9) also investigated the Goodenough drawing test and concurred that it was a satisfactory instrument for measuring intelligence, only if the child was free from emotional disturbances.

Investigations Employing Personality Tests to Explore Emotional Factors

Sloan (89) administered the Rorschach to 15 pairs of mentally retarded subjects who had been out on wage placement. One member of each pair returned for failure to adjust, while the other member was successfully employed. A quantitative statistical comparison of Rorschach factors failed to distinguish successful from unsuccessful wage placements. Jolles (48, 49) employed the Rorschach in two investigations of memtally retarded children. On the basis of his studies he concluded that the factors which are responsible for retardation embrace a necessary component of emotional and personality maladjustment. In one study (49) he found all his retarded subjects to have serious emotional disturbances. These findings led him to suggest that mental retardation of the familial and undifferentiated type is a symptom of personality disorder rather than an indication of lower intellectual functioning. Carried to its logical determination, the study would support the belief that mental retardation per se is not an isolated entity and contains a great deal of equivocation. Birnbaum (16) insisted on an holistic approach to the study of the mentally retarded individual because the mentally retarded personality represents a pattern of interconnecting variables including biological, social, emotional, and intellectual. Hillard (38) considered the needs of mentally retarded children and suggested that mentally retarded children with emotional disturbances secondary to their lowered intellectual capacity will profit from special class instruction. The child with primary emotional disturbance will not profit from such instruction and should be directed to a psychiatric clinic for help.

Investigation of Personality Factors and Employment of Tests of Personality Measurement with Achieving and Non-Achieving Normal Subjects

Some investigators employing personality tests as predictors of school achievement have produced equivocal and conflicting results. Cronbach (26) and McCandless (59) investigated the Rorschach as a predictor of academic achievement with college students and officer candidates for the United States Maritime Service, respectively. McCandless' subjects received individual administration of the Rorschach, while the subjects in Cronbach's study received the group Rorschach. Analysis of Rorschach scores for both studies failed to demonstrate any important statistical significance between achievers and non-achievers. Hohne (39) submitted college freshmen to a battery of psychological tests including the group Rorschach to predict academic success. His results show none of these measures singly or combined to contain sufficient validity for predictive purposes. Osborne, Sanders and Green (67) completed a study on a large sample of college freshmen comparing the ACE[1] scores with the Rorschach for predicting achievement. The ACE scores proved a much better predictor than the Rorschach alone. Griffiths (36) administered the Bell Adjustment Inventory and found significant differences lacking between college students of high academic achievement and those with lowest academic achievement. He did report that there was some evidence of a positive correlation between scholastic achievement and personality characteristics. Parrish and Rethlingshafer (68) tested in hypothesis that at a given level of intelligence achievement in college is a function of need to achieve as measured by the TAT[2]. These authors report that the difference in the need to achieve between the more and less successful students was not significant for the two groups of 24 subjects when equated for intelligence.

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[1] The American Council on Education Psychological Examination is commonly known as the ACE and shall be referred to as such in this study.

Garrett (33) investigated factors which are supposed to be related to scholastic success and reported that no test of personality has yet been devised which has any predictive value in predicting academic success in college. Travers (96) reported that approximately one thousand studies over a period of fifteen years have been designed to predict some aspect of academic achievement. He concluded that the actual contribution of these studies to the already accumulated knowledge had relatively little value.

Kimball (52), in a study employing the Sentence Completion Test with superior intelligent non-achieving adolescent boys, found essentially more negative relationships with fathers than with the control group achieving subjects. She also reported that aggressive feelings provide a source of unexpressed guilt and anxiety. Altus (3) and Winberg (100) administered the MMPI[3] to college students. They tested the hypothesis that the MMPI might differentiate between achievers and non-achievers on adjustment. Although the instrument did not differentiate between them, the MMPI exposed tendencies for greater adjustment associated with achievement. Montalto (64) and Steinzor (92) studied Rorschach responses of achieving and non-achieving college students and reported that the non-achieving group gave more indications of being less well adjusted. In addition, Montalto indicated that his achieving group's results reflected some neurotic trends, exhibiting intellectual over-ambitiousness and responded less efficiently to external stimuli than healthy persons. Morgan (65) proposed that among several variables contributing to achievement, motivation to achieve played an important role in attaining academic success. Spache (91) measured personality characteristics of retarded readers with the Rosenzweig Picture Frustration Test. The retarded readers differed significantly in their responses from normal children. They presented an inclination to be more aggressive and to show more resistance and negativism, particularly toward peers.

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[2] The Thematic Apperception Test will be referred to as TAT in the remainder of this study.

[3] The Minnesota Multiphasic Personality Inventory will be referred to as the MMPI in the remainder of this study.

Research Investigating Factors Related to Achievement Employing Intelligence Tests, Primary Mental Abilities Scales and Achievement Measures

Shaw (49) investigated the relationship between Thurstone's Primary Mental Abilities and high school achievement. His study revealed verbal meaning to be highly related to achievement, while number, word fluency, space, and memory scores showed little relationship with achievement. Wolking (101) attempted to predict academic achievement from the Differential Aptitude Test and the Primary Mental Abilities. He found the tests to be effective in predicting science, geometry, and algebra grades. The Differential Aptitudes Test was a better predictor than the Primary Mental Abilities. Russell (76) explored characteristics of good and poor spellers on the basis of the Primary Mental Abilities. He noted that, with the exception of space, high achievers in spelling scored relatively high on all tests of the Primary Mental Abilities. Visual and auditory discrimination abilities were closely related to spelling ability at the third and fourth grade levels but not so clearly related at the seventh and eighth grade levels. Bond and Fay (21) comparing the performance of good and bad readers on the Binet, reported good readers as a group performed significantly better on items dependent on knowledge and use of words, while poor readers were superior on non-verbal memory items. Bliesmer (18) considered reading abilities of bright and dull children of comparable mental ages. The bright children performed significantly superior to dull children on total heading comprehension, memory for factual details, perception of relationships among definitely stated ideas, listening comprehension, and more complex intellectual abilities. The groups were similar with respect to reading rate, word recognition, and word meaning. Frandsen (31), Merril and Heathers (63), employing the Wechsler-Bellevue as a predictor of achievement, found the verbal scales of the Wechsler to be an adequate predictor of academic achievement. Merril and Heathers (63) found the L scale of the ACE to predict academic achievement better than the Q scale, but the verbal scale of the Wechsler proved superior to the performance scale in predicting achievement. Raymond (73) studied the performance of reading achievements on memory span and associated learning tests and reported the achiever to be superior to the retarded reader on all of these tasks. Adcock (2) investigated high level achievement and factor-analyzed test scores and ratings of college students. He identified 6 factors: high level mental ability, perceptual speed, impulsiveness, drive or ego involvement, practical carefulness, and immediate memory (verbal), to be highly related to achievement. Rosslein's (75) study revealed differential patterns of intelligence traits between high achieving and low achieving high school boys. The chief differences between the high achievers and low achievers proved to be an integrating factor (preponderance of cognitive g) and superior abstract reasoning.

Ratchick (70) completed a comprehensive study of achievers and non-achievers, matching the groups in age, sex, intelligence quotient, and high school class. He administered a full battery of psychological measures: personality, intelligence, educational achievement tests, and questionnaires to the parents to obtain background and other social data. Although he found significant differences, no single variable could predict non-achievement on a priori grounds. His study unequivocally indicates that factors which contribute to non-achievement are so varied and complex that they can only be described qualitatively, and while they may be isolated individually, they exhibit no clear-cut connection to an over-all achievement and non-achievement pattern.

Audiology and Speech Pathology

The following literature in this area will be reviewed:

1. speech and language development of normal children;
2. incidence of defects, type of defects, and language investigations of non-institutionalized mentally retarded children.

Speech and Language Development of the Normal

Templin (95) and McCarthy (60) have evaluated most of the literature dealing with speech and language development among normal children. McCarthy's studies and review include the literature to 1946, while Templin covers the literature to 1957. McCarthy (61) reported a study based on the manual recording of 50 consecutive responses from 140 children ranging in age from 18 to 54 months. She investigated a number of variables but the three pertinent to this study include: length of response, complexity of sentence structure, and proportion of the various parts of speech.

Templin (95) investigated speech and language development among normal children. Her study included long-term techniques in which she described the development and interrelationships of articulation of speech sounds, speech sound discrimination, sentence structure, and vocabulary. Her subjects comprised 480 children of equal numbers of boys and girls from 3 to 8 years of age at half-year levels.

Length of Response

McCarthy reported mean length of response to be " . . . reliable easily determined, objective, quantitative and easily understood measure of linguistic maturity" (60, p. 522). She correlated length of sentence with different age levels (60).

Age	Length of Sentence
3 1/2 years	4 words
6 1/2 years	5 words
9 1/2 years	6 or 7 words

Templin (95) reports a significantly greater mean length of response for her subjects above 3 1/2 years of age. Nevertheless, both Templin (95) and McCarthy (60) agree that the proportion of one-word responses decreases with age.

Complexity of Structure

McCarthy (60) and Templin (95) find an increase in complete sentences with increasing age with a concomitant decrease in the use of functionally complete but structurally incomplete sentences. McCarthy (60) further reports incomplete sentences decreased from 25 percent at 2 years of age to approximately 8 percent at 4 1/2 years. Templin (95) found the number of incomplete sentences remained stable after 6 years of age.

McCarthy (60) reports that elaborated sentences constituted 6 percent of the sentences at 4 1/2 years of age and increased to 10 percent by 9 1/2 years. Templin (95) found her subjects used more elaborated sentences in comparison with the earlier studies (28, 61), with the exception of the subjects who were 8 and 9 1/2 years of age.

Proportions of Various Parts of Speech

McCarthy (61) found a decrease with increasing age in the use of nouns and interjections, and an increase in the use of conjunctions and prepositions, while the number of adverbs remained constant. Templin (95) maintained that after 3 years of age, parts of speech stabilized near these levels: nouns, 20 percent; adjectives, 15 percent; adverbs, 7 percent; pronouns, 20 percent; conjunctions, 4 percent; prepositions, 7 percent; interjections, 1 percent; and miscellaneous, 1 percent.

Grammatical Errors

Templin (95) and Smith (90) investigated grammatical errors. Templin (95) found the following order of errors according to frequency: use of "got" for "have," errors in agreement between verb and subject, omission of the auxiliary, colloquialisms and slang, beginning sentence with "and", errors in conjugation, errors in word order, use of "ain't," redundancy, double negative, errors in use of the preposition, errors in gender and number of noun or pronoun, errors in the auxiliaries "can" and "may," and comparison of adjectives or adverbs.

Smith (90) analyzed 305 records of 220 different children with a chronological age range of 18 months to 6 years. Most common errors in order of frequency were errors in the use of the auxiliary, omission of the article, errors in agreement between verb and subject, use of "got" for "have," use of "ain't" and "hain't," errors in the number of the noun or pronoun, errors in word order, and errors in the gender of the pronoun.

Speech and Language Development of Non-Institutionalized Mentally Retarded Children

A search of the literature reveals only a few studies concerned with non-institutionalized mentally retarded children.

Incidence

Ingram (44) surveyed the speech efficiency of mentally retarded children in the Rochester, New York special classes. She reported 12 or 13 percent of the children from 8 to 10 years of age, and 4.5 percent of the children from 13 to 15 years of age, had speech defects. She did not report the incidence of defects from 11 to 13. These percentages were compared to an incidence of 2 or 3 percent in the regular grades.

Louttit and Halls (56) employed a questionnaire method in surveying speech defects of school children of Indiana cities with populations over 100,000 and found the incidence in special classes varied from less than 1 percent to 21 percent. They compiled their data from 63 returns. The teachers defined the criteria employed in the selection of speech defective children. The mentally retarded children attending special classes exhibited approximately 3 times as many defects as the normal children in this study.

The New York State Department of Mental Hygiene conducted a survey[1] of 111 children in Onondaga County of school age but who were not in school. Only 6 of the 111 children were found to have normal intelligence. Of the remaining 105 children, most of the educable and trainable mentally retarded children had severe speech impairments. Many of these children had come to the Gordon D. Hoople Hearing and Speech Center for help in speech. Their speech performance was marked with many omissions, substitutions, and distortions.

Speech Problems

Strazzulla (94) studied 24 mongoloid children with intelligence quotient scores from 40 to 79. The children were outpatients at the Morris J. Solomon Clinic at the Jewish Hospital, Brooklyn, New York. Her results indicated the order of speech

[1] Personal communication from Dr. Matthew J. Trippe, Research Assistant Professor, Syracuse University.

sound difficulty as follows: (s), (t), (d), (f), (v), (θ), (b), (d), (k). These children had greatest difficulty with the (r) and (l) blends.

Batza (10) studied 108 mentally retarded children from the Chicago public school special classes. Two intelligence quotient groups were represented: the group with the intelligence quotient scores from 70 to 85 included 35 children, 18 males and 17 females; the group with intelligence quotient scores from 60 to 69 comprised 38 children, 21 males and 17 females. Chronological age means for the two groups were 14.18 and 14.15 years, respectively. Thirty-five children had intelligence quotients below 59 and were not utilized when comparing Batza's study with the present investigation. These children are not characteristic of the subjects utilized in the present investigation. Batza employed the imitative method for articulation testing; he tape-recorded the responses. The errors were classified as omissions, substitutions, distortions, additions, and mildly indistinct sounds. The order of frequency of errors was: (ð), (θ), (ʒ), (r), (ʃ), (dʒ), (tʃ), (v), (d), (ŋ), (g), (f), (l). Sounds with the same frequency of error were: (tʃ), and (v); (d), and (ŋ); (g), (f), (l). No errors were made on (p), (b), (m), (h), (w), (n), (ʍ). Fifty-seven percent of the errors on (θ) and (ð) were (t) and (d) substitutions. Most distortions occurred on (θ), (tʃ), and (ʃ). The sound most frequently omitted was (r).

Language Efficiency

Strazzulla also summarized her own and two other investigations (34, 50):

> Three studies of non-institutionalized retarded children showed that on an average the youngsters who began using words at 3 years, are capable of constructing simple sentences by 7 - 8 years of age (93, p. 55).

Karlin and Strazzulla (50) studied 13 children with intelligence quotient scores from 51 to 70; a mental age range of 1 year 8 months to 7 years 11 months; and a chronological age range of 3 years 9 months to 14 years 1 month. They concluded that practically none of the children were able to describe a game they played or retell a story in logical sequency. A basic defect in communication was also noted:

> Some of the children in the group showed a proclivity toward 'glibness' in conversation. For a short time they appeared poised, relevant, and well-informed. Soon, however, one noticed that there was little if any depth in what they were saying. It was almost as though they had memorized some packaged phrases and learned to use them at certain times. Again, abstract or creative thinking was lacking. This tendency toward glibness was noted especially among the older girls (50, p. 291).

Batza (10) used simple colloquial stimulus questions to elicit 50 responses. He analyzed the responses in compliance with the McCarthy methodology (61). Batza comments:

> The success with which this research technique has been applied in gaining insight into the mental activity of the normal child is strongly indicative of the utility of similar research in the study of the mentally deficient (10, p. 5).

He analyzed the data for mean number of words spoken per sentence, relative proportion of various parts of speech, and complexity of sentence structure. The mean sentence length for the higher group (intelligence quotient 70 to 85) was 7.62 words; for the lower group (intelligence quotient 60 to 69 inclusive) was 7.35 words. Mental age and sentence length correlated significantly at the .01 level. He presents the following percentages for the parts of speech:

	Noun	Pronoun	Article	Verb	Adjective
I.Q. 70 to 85	16.41	20.93	8.00	22.78	8.30
I.Q. 60 to 69	18.34	20.24	8.72	22.00	7.39

	Adverb	Preposition	Conjunction	Interjection
I.Q. 70 to 85	8.21	8.97	5.87	.53
I.Q. 60 to 69	7.52	10.01	5.42	.36

The proportion of complete sentences to total sentences was approximately 60 percent for the higher group, approximately 50 percent for the lower group. Elaboration of sentences decreased with decreasing intelligence quotient while single words and incomplete sentences increased with decreasing intelligence quotient.

The language variables distributed themselves bimodally; the children with intelligence quotient ratings below 60 seemed to constitute a different group. In articulation the sub-groups also showed significant differences.

There is a fairly extensive parallel literature concerning the speech and language (8, 32, 79, 80, 81, 82, 83, 88) of the institutionalized mentally retarded child. Research (78) supports the conclusion that significant differences exist in the speech and language development of institutionalized and non-institutionalized mentally retarded children.

Social Casework

The social casework methodology investigates the individual's environment, growth factors, and relationships in assaying the multiple influences that affect development. The social worker's approach leans heavily on the interview technique.

Although the application of social casework as a therapeutic device has been employed for some time, literature concerning the interview as a research technique reflects its limitations. Further examination of the literature discloses very little research on social casework with mentally retarded children. Hyman, Hart, Cobb, Feldman and Stember (43) appraised the validity of the interview as a research technique. On the basis of their results, little interviewer bias appeared in comparable interviews. They also reported validity increased when the social worker and individual were involved in mutual participation and completion of a task. The greater interaction between the social worker and the individual usually resulted in the transmission of more information. Validity increased with the amount of information transmitted.

Preston and Mudd (70) focused on the loci of difficulties when using casework interviewing as a research tool. The individual providing the information frequently exhibited anxiety that the information might result in a betrayal of confidence. The authors reported types of interviews were scattered on a continuum and consequently did not lend themselves to formal research control. Since the type of interview introduces great variability, standardization of interviewing technique presents serious difficulty. A research situation may generate anxiety for both the social worker and the individual since the social worker becomes involved in the conflict of establishing a balance between a less subjective and more objective interview. In attempting to set up an interview designed for reporting purposes she may communicate less and engender inadequate attitudes in the individual. The individual may be threatened by what appears to him to be a detached approach to his problems.

Goode and Hatt (35) emphasized the need for a quantitative classification of data but they also introduced the concept of a system of qualitative coding which would extract the exact information for the study. The study supports the concept of exact definition of factors quantitatively and qualitatively classified by means of commonality of factors. Eleanor and Nathan Macoby (57) elaborated the employment of interview techniques in research. The specific wording of the questions and the ultimate purposes of the interview inevitably determined the ultimate results.

Many writers have emphasized the importance of home environment upon the school progress of the mentally retarded child. Kelman stated:

> Parents and siblings in turn affect the child and can contribute significantly, positively or negatively, to his larger social adjustment, or to the progress of his immediate school or training program (51, p. 596).

Sarason (77) analyzed early parental reactions to the discovery of the nature of their child's retardation. Parents' reactions often exhibited signs of resistance, anxiety, despair, hostility, and frustration.

Child psychiatrists have clearly defined and accepted their responsibility for the mental health of children with retarded mental development and have carefully elaborated upon the important contribution of parental and environmental factors in the development of the mentally retarded child. Humpreys (42) stressed the psycho-dynamics of child-parent and environmental influences on subsequent adjustmental behavior of children with retarded mental development.

The interaction between the mentally retarded child and his environment has also been approached by analyzing the child. Johnson (45) stressed the need for systematic review of all aspects of child development sequences in appraising adjustmental behavior. Williams (99) reported that identification instrumentally influenced mentally retarded delinquents in learning acceptable behavior.

A review of the psychological literature provides meager data for supporting the construct that non-achievement may be successfully _a priori_ predicted on the basis of one or a battery of psychological tests. Many of the studies are restricted and lack rigorous control of experimental conditions and consequently present contradictory results. Some studies do not define their populations, are vague and nebulous with respect to their selection of subjects and procedure. Some studies draw unwarranted generalizations on the basis of defective experimentation. Other investigations attribute causal relationships to a single variable.

Evaluation of the literature in audiology and speech pathology reveals relatively little information on the speech and language behavior of non-institutionalized mentally retarded children with intelligence quotient ranges from 60 to 75. Many of the studies project generalizations based on a very limited number of subjects. Furthermore, the studies deal with children with a wide range of intelligence quotients so that no generalizations could be made about those children who fall into the 60 to 75 range. Some of the experiments do not present clear-cut designs and manifest gaps in the selection of subjects, materials, and methods.

Inspection of the literature reveals that for some time social casework has been extensively used. A great many writings exist dealing with the dynamics of the social casework approach. Nevertheless, relatively little objective study of the use of social casework as a discipline in research appears in the literature. Moreover, its application to mentally retarded populations is limited and restricted.

CHAPTER III

THE EXPERIMENTAL DESIGN AND PROCEDURES

Selection of Subjects

From a pool of more than 200 mentally retarded children, 50 achievers and 50 non-achievers were selected from the Port Washington, Great Neck, Mineola, Roslyn, and Manhasset, Long Island; and Binghamton, New York public schools. The following criteria provided the bases for the selection of the subjects:

1. Intelligence quotient scores between 60 and 75 on the Revised Stanford-Binet Intelligence Scale Form L. The rationale for selecting subjects whose intelligence quotient scores fell within this range was:
    a. These children would fall into the category of the most educable of the retarded group.
    b. They have the potential for making an adequate vocational and social adjustment in adulthood.
    c. Children whose intelligence quotient scores are below 60 often embrace other stigmata: greater incidence of organicity, neurophysiological disabilities and other complications.
    d. Children with intelligence quotients above 75 were not chosen because:
        1) They are not legally considered retarded.
        2) This borderline group comprises an aggregation of slow learners, emotionally disturbed, educationally disabled, and deprived children.
2. The groups were arbitrarily selected on the basis of their performance on the Metropolitan Achievement Test. The achieving group was defined by the Metropolitan Achievement Test as functioning scholastically at about their Binet mental age level or higher. The non-achieving group was defined as functioning at least one school year below their mental age. While one school year may not represent serious educational deficiency for normal children, nevertheless, the seriousness would depend on their grade level and also on the etiological factors responsible for the lowered efficiency level. When further educational retardation is superimposed on

an already existing mental retardation, such contamination may culminate in catastrophic disorganizing behavior.

3. Children with hearing losses were eliminated from the study. Normal hearing was measured at threshold with pure tone audiometry.

Psychological Materials and Procedures

The following test battery was administered to all the children:[1]

1. Revised Stanford-Binet Form L.
2. Metropolitan Achievement Test.
3. The Revision of the Leiter International Performance Scale (1948).
4. Draw-A-Person (Machover).
5. The Bender Motor Gestalt.
6. Draw-A-Man (Goodenough).
7. The Rorschach Psychodiagnostic.
8. The SRA Primary Mental Abilities.

Intelligence Test

The Revised Stanford-Binet Form L was administered to determine the subjects' intelligence quotient mental age, and vocabulary age. Since the Revised Stanford-Binet Form L does not contain a vocabulary subtest for all age levels, the Vocabulary Mental Age Scale, Table 1, was employed in assessing the vocabulary age of the children in both groups. The examiner devised this scale in order to assign mental age scores to the total number of

the year VI level has a vocabulary subtest, but in order to receive credit for this test the subject must answer 5 words correctly. The next appearance of the vocabulary subtest is on the year VIII level, where a total of 8 correctly defined words is necessary for passing. The Binet Manual does not indicate adjustment between successive levels. Children responding between these categories might be penalized, since no partial credit score is allowed. The rationale of assigning 8 months to each word beyond the limit would appear to be desirable as representing a more adequate

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[1] The examiner explicitly adhered to the standardized instructions in the administration of all the tests. Any deviation from the standardized instructions will be so reported.

TABLE 1

VOCABULARY MENTAL AGE SCALE

Number of Vocabulary Words Correctly Defined on the Revised Stanford-Binet Form L Vocabulary Test	Vocabulary Mental Age
5[a]	6-0
6	6-8
7	7-4
8[a]	8-0
9	8-8
10	9-4
11[a]	10-0
12	10-8
13	11-4
14[a]	12-0
15	13-0
16[a]	14-0
17	14-8
18	15-4
19	16-0
20[a], [b]	AA 16+

[a] Identical criteria to those used on the Binet.

[b] Not one subject reached this level.

measurement of the vocabulary age. Consequently, when 6 words are answered correctly, the individual receives a mental age of 6-8 rather than 6-0 as indicated by the manual. When 7 correct words are scored, a mental age of 7-4 is indicated rather than 6 years. The separation of 8 months becomes convenient, eliminates overlapping, and fills in vacancies between the 6 and 14 year levels of the Stanford-Binet. This kind of adjustment permits credit for correct responses and does not penalize the child.

Achievement Test

The Metropolitan Achievement Test was arbitrarily selected for differentiating achieving from non-achieving subjects.

To determine the different achievement levels on the various subtests of the Metropolitan and explore whether the subtests differentiated the groups, the total achievement score was devised by averaging all the subtest scores except the arithmetic fundamentals subtest. The arithmetic funcamentals subtest was omitted from the total achievement score because research (12, 27) has unequivocally reported serious limitations for this test as an exaggerated contribution to the total score. Bennberg (12) related various achievement subtests with the mental age of the Stanford-Binet to determine the effect of variables which might influence achievement. He found that the average arithmetic scores were not significantly below the mental age. Cruickshank (27) compared mentally retarded boys with normal boys of comparable mental age using three types of arithmetic problems. He found the normals to be superior in all areas with least difference in arithmetic example in computational form.

Performance Scales

The Revision of the Leiter International Performance Scale (1948) was administered to all the subjects to determine:

1. intelligence quotient and mental age,
2. whether or not the two groups differed in performance on a non-verbal scale.

The Draw-A-Person Test

This test was administered to the two populations. The examiner instructed the child to "draw a person." After the child completed the first drawing he was instructed to draw a person of the opposite sex. Upon completion of each drawing the examiner instructed the subject to identify the person in terms of sex. The Draw-A-Person Test was administered before the Draw-A-Man Test.

The rationale for administering the Draw-A-Person Test first rather than Draw-A-Man was to eliminate suggesting to the child the specific sex, since the instructions for the Goodenough test explicitly state, "Draw a man." The Draw-A-Person Test was not quantitatively evaluated according to Goodenough; instead the Draw-A-Man Test was included in the battery. Bliss and Berger (19) tested the hypothesis that a subject instructed to draw the human male figure in response to the Goodenough instruction will obtain a mental age significantly higher than when instructed to produce a figure under the Machover instructions. Bliss and Berger's experimental subjects included borderline moron, and imbeciles. The study verified the hypothesis for subjects of familial etiology, but although the organics scored somewhat higher on the Goodenough scale, the differences were not significant. This test proposed to determine the presence of difficulty, confusion, and ambivalence in sexual identification (6, 7). When the sex of the first drawing was the same as the child's, the subject's identification was considered relatively free of confusion, difficulty, and ambivalence. If the child drew the opposite sex first presence of confusion, difficulty, or ambivalence in sexual identification was considered.

Unfortunately, because of time limitations, extensive evaluation of the drawings could not be undertaken. Size, omission of parts, quality of lines, presence of shading, overemphasis, distortions, and other clinically significant implications were not investigated. In several instances the sex of the human figure drawn was indeterminable but was scored male or female on the basis of the subject's verbal identification of the drawing. Some figures appeared to be feminine but were scored male because the subject identified them as male.

Performance Tests

The Bender Motor Gestalt

This test was employed to determine whether differences existed between the groups in psycho-motor performance. Each protocol was analyzed, evaluated, and quantified. The criteria used for scoring and analyzing the test were devised by the examiner for the following reasons:

1. to quantify the test, by using a relatively uncomplicated brief scoring procedure;
2. to employ categories that are clinically pertinent. The final scores were not solely a quantitative expression, but served as useful indicators as to the type of quality of the perceptual-motor performances.[2]

---

[2] See Appendix A.

The Goodenough Draw-A-Man Test

This test was administered to both populations to determine the subjects' intelligence quotient and mental age on a non-verbal performance intelligence test and also to discover whether the groups could be differentiated on their performance on this test. This instrument was included because of its reported freedom from cultural influence.

Projective Technique

The Rorschach Psychodiagnostic Test was included to permit examination of the performance of both groups for the purpose of evaluating personality disturbances. The test was selected to investigate whether differences existed between the groups. The administration of this projective technique rather than other projective tests of personality was decided upon because it lends itself to a high degree of quantification. The protocols were scored according to the Klopfer method (53).

Primary Mental Ability Scale

The SRA Primary Mental Abilities Test was administered to both populations. This test was selected to investigate the subjects' performance and to evaluate whether the groups could be differentiated on any or all of the Primary Mental Abilities. The categories comprising this test are conclusive to statistical analysis and alone may provide information concerning the contribution of the various abilities to specific and general mental functioning. Whenever the raw scores on the various categories fell below the minimum levels of the test, the minimum level score was assigned and marked with a minus sign to indicate the actual score was below the recorded score.[3]

Audiology and Speech Pathology Materials and Procedures

Each child was administered the following tests: auditory and visual skills, oral and peripheral examination (47), examination of muscular control for speech (47), sensorimotor involvement, articulation test, and spontaneous language (61).

Auditory Disturbances

1. Auditory Recognition

The purpose of this test was to determine the child's ability to recognize an auditory signal. Figures 1 and 2 present

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[3] Personal communication from Mrs. Shirley McDade, Educational Sales Division of Science Research Associates.

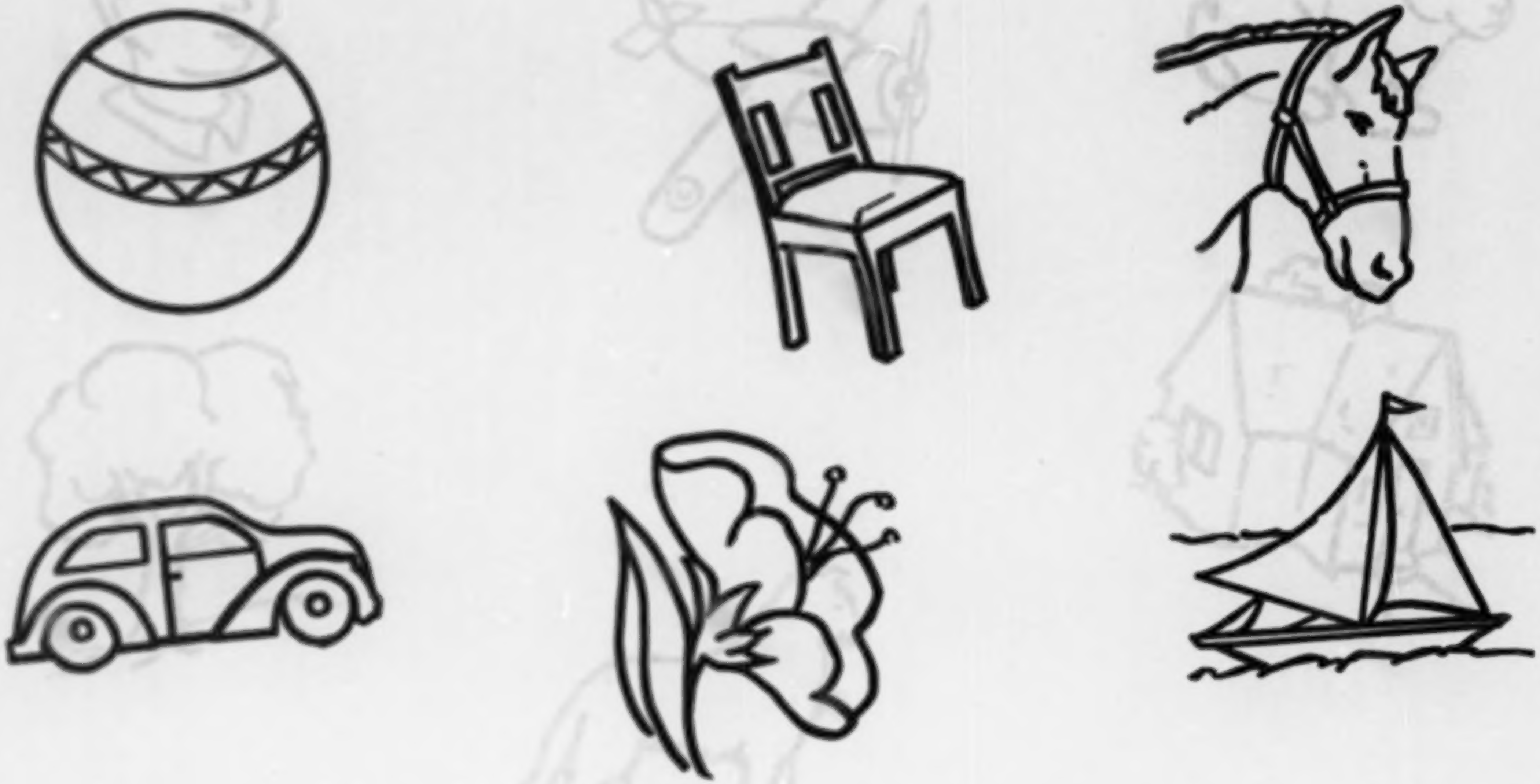

Fig. 1.—Testing material.

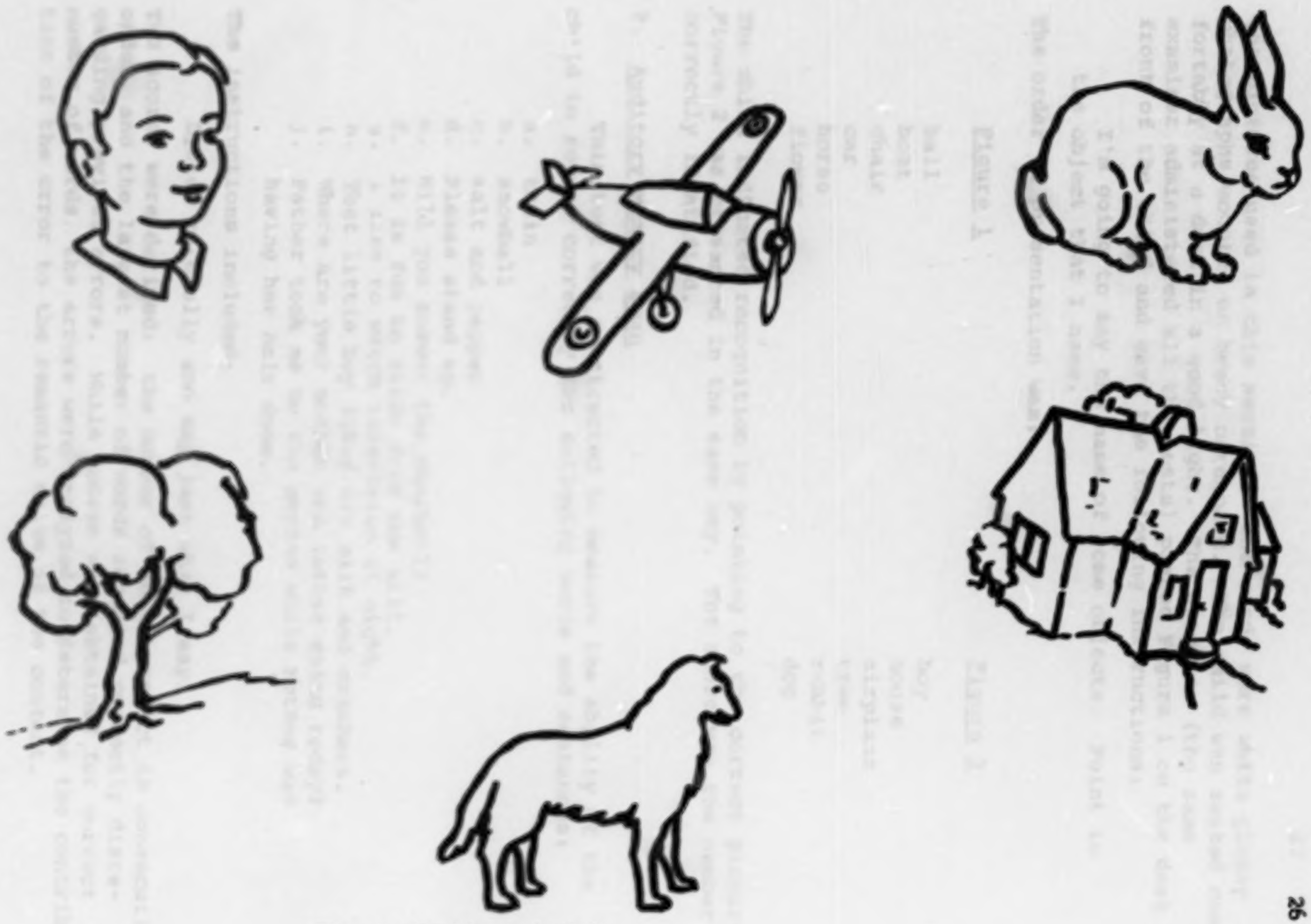

Fig. 2.—Testing material.

the pictures used in this section. The cards were white glossy photographs mounted on heavy cardboard. The child was seated comfortably at a desk in a good light. The examiner (the same examiner administered all the tests) placed Figure 1 on the desk in front of the child and gave the following instructions:

> I'm going to say the name of some objects. Point to the object that I name.

The order of presentation was:

Figure 1	Figure 2
ball	boy
boat	house
chair	airplane
car	tree
horse	rabbit
flower	dog

The child indicated recognition by pointing to the correct picture. Figure 2 was presented in the same way. The score was the number correctly identified.

2. Auditory Memory Span

This test was constructed to measure the ability of the child to repeat correctly the following words and sentences:

a. train
b. snowball
c. salt and pepper
d. Please stand up.
e. Will you answer the doorbell?
f. It is fun to slide down the hill.
g. I like to watch television at night.
h. That little boy likes his milk and crackers.
i. Where are your mother and father going today?
j. Father took me to the movies while Mother was having her hair done.

The instructions included:

> Listen carefully and say just what I say.

Two scores were derived: the number of words correct in consecutive order, and the largest number of words repeated correctly disregarding previous errors. While scores were obtained for correct number of words, the errors were analyzed to determine the contribution of the error to the semantic value of the content.

3. **Following Directions**

This subtest indicated the child's ability to follow simple directions. The following toys were placed (in set order) on the desk before the child: dial telephone, plastic horse, wooden box, bell, spoon, cowboy, cup, ball, Indian, and a small red car. The children were instructed:

a. Ring the bell.
b. Catch the ball.
c. Put the ball into the cup.
d. Put the horse into the box.
e. Bounce the ball three times.
f. Move the Indian next to the cowboy.
g. Pick up the telephone and say, "Hello!"
h. Put the spoon between the cup and the ball.
i. Place the car on the table and push it to me.
j. Pick up the crayon, draw a line on the paper, and put the crayon back in the box.

The child's score was determined by the number of correct performances.

4. **Following a Paragraph**

The following paragraph was employed to determine how well the child was able to understand:

> Mary worked for her mother all morning. At lunch, she was too tired to eat. When Jane went to see Mary, she found her asleep.

The child was instructed:

> I am going to tell you a story. Listen carefully because when I finish, I will ask you some questions. Are you ready?

The examiner asked three questions:

a. What did Mary do all morning?
b. When was she too tired to eat?
e. Who found Mary asleep?

The child's score was the total number correct.

5. Following a Story

The children were instructed:

> I am going to tell you a longer story. Listen carefully and when I finish, you tell the story back to me. Are you ready?
>
> A big brown cat ran away from hom. She went with two other cats. It began to rain. They went under a tree and got all wet. They were glad to get home.

The examiner copied the child's story verbatim and scored it on the following 14-point scale:

big
brown
cat
ran
away, or went out
from home

went
with cats
two other

began to rain or was wet
went under a tree
got all wet
were glad
to get home or went home or come back

Visual Disturbances

1. Matching Picture with Picture

This test was intended to determine the child's ability to match two picture stimuli. Figures 1 and 2, twelve 2-inch by 3 1/2-inch cards with the individual pictures, and a stop watch were used. The examiner placed Figure 1 on the desk in front of the child, handed him the set of six small cards, and instructed him:

> Match these pictures with a picture on the card.

Figure 2 was presented in the same way. The score for this test was based on time taken to complete each task to the nearest .2 of a second.

2. Matching Letter with Letter

This test measured the child's ability to match letters. Materials were five 5-inch by 8-inch cards with six letters each 3/4 inch high, and thirty 2-inch by 3 1/2-inch cards divided into five sets of six letters each:

W	F	H	t	n
N	E	G	p	u
V	B	C	d	r
M	K	Q	f	h
L	P	D	b	c
J	R	A	q	e

The first card was placed in front of the child, he was handed the corresponding small cards, and instructed:

Match this letter with a letter on your card.

The score was the time taken to do each of the five tasks.

3. Matching Number with Number

This test evaluated the child's ability to match numbers. Materials utilized consisted of two master cards 5 inches by 8 inches with five numbers each.

8	9
36	24
14	58
720	637
957	160

Ten small cards each imprinted with one number comprised the rest of the testing material. The master card was placed on the desk in front of the child and the corresponding small set handed to him. The child was told:

Match these numbers with a number on your card.

The scoring in this case consisted of the time periods needed to complete each of the series.

4. Matching Word with Picture

This test was designed to measure the child's ability to match a word stimulus with a picture. Figure 1, Figure 2, small corresponding word cards in primer type, and a stop watch were used. Figure 1 was placed on the desk in front of the child, he was handed the small cards, and told:

Match this word with one of the pictures on your card.

The same procedure was followed for Figure 2. The scores for the test were the time intervals. Inability to read resulting in random guessing or refusal of the task was noted.

5. Matching Sentence with Sentence

This test evaluated the child's ability to match sentences. Materials were 2 master cards 5 inches by 8 inches printed in primer type with 6 sentences each, and 12 small sentence cards in 2 sets of 6 each:

a. Father is reading my pretty books.
b. The boys are kicking the football.
c. Susan gave me some filled cookies.
d. He wants to go along to the party.
e. My sister and I like gum and nuts.
f. The cat was playing with the ball.

a. My dog barked and chased the cars.
b. My friends and I are going to run.
c. The pony and the dogs are friends.
d. Dick looked at a book for an hour.
e. Dick and Sally came with us today.
f. Rabbits eat peas and many carrots.

The master card was placed in front of the child, he was handed the small cards, and instructed:

> Match these sentences with a sentence on the card.
> DO NOT READ THE SENTENCE.

The instruction not to read the sentence was repeated as many times as necessary. The same procedure was followed for the second card. The score was the time in seconds needed for each task.

6. Matching a Single Word with a Word in a Sentence

This test was intended to determine the child's ability to match a word as it occurred in a larger configuration, the sentence. Materials were three 3-inch by 5-inch cards, and one 5-inch by 8-inch card. These words and sentences were used:

to
and
my

The boys and girls have a ball.
He wants to go to my party now.
My friend and I like to go out.

The master card was placed in front of the child, and he was handed each of the small cards separately. For each of the small cards the child was told:

> This little word is some place in the sentences on your card. Find it and point to it.

This test was scored in seconds taken to complete the entire task.

Oral and Peripheral Examination

An oral and peripheral examination was given to each child. Materials used were tongue blades, flashlight, mirror, counter, stop watch, and balloons. The child was told:

> I am going to look into your mouth to see how your tongue and parts of your mouth work for speech. Would you please turn and face me?

The examiner demonstrated all of the instructions as many times as necessary throughout the test. The small flashlight was used for illumination; the mirror for details of structure; the tongue blades were used only when absolutely necessary (two instances) for depressing the tongue. The instructions to the child in evaluating motility of lips, tongue, and velum were minimal; demonstration by the examiner was the chief stimulus. The score for each child was based on a 5-point scale measuring deviations of occlusion, teeth, tongue and velum.[4]

Examination of Muscular Control for Speech

This test considered movement of the articulatory structures as neuro-muscular units. Examples of items:

1. sustaining steady phonation (10 times);
2. opening and closing mouth, mandible, and lips moving together (10 times in 10 seconds);
3. opening and closing lips, teeth together (10 times in 10 seconds).

A flashlight, counter, and stop watch were used. All instructions were given by demonstrating the task.

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[4] See Appendix B.

Sensorimotor Involvement

These words tested the child's ability to make correct sounds involving three articulators: lips, tongue, and soft palate. The fourth part was composed of sounds requiring complex articulatory adjustments. The stimulus words were:

Lips	Tongue	Palate	Complex Coordinations
1. pie	6. toe	13. key	15. see
2. boy	7. day	14. go	16. shoe
3. me	8. no		17. joy
4. foe	9. lie		18. chew
5. vow	10. row		19. split
	11. they		20. spry
	12. yes		21. street
			22. screw

Instructions to the child were:

Listen carefully and say just what I say.

Only one stimulation was given. The four sections were scored as correct or incorrect.

Articulation Test

Each child was administered a test of articulatory proficiency and ability to modify incorrect productions upon stimulation. The picture articulation test was composed of 23 consonants in the initial position, 25 consonants in the medial position, and 21 consonants in the final position. Nine vowels, 6 diphthongs, and 13 blends were also tested. Instructions to the child were:

Tell me what this is.

During pilot studies it was found that certain responses could not always be elicited with the picture alone. The sound, its position, the picture used, and supplemental clues are given below:

Sound	Position	Picture	Supplemental Clues
(θ)	initial	thumb	What is this? (examiner making gesture of pointing thumb)
( )	initial	this one or that one? (apple-pear)	Which one do you like best?
( )	medial	towels--bathtub	The towels are rough, the bathtub is _______(smooth)
(z)	initial	zoo	The children are at the ____(zoo)
( )	medial	black and white dogs	What color are the dogs?
(j)	initial	yellow	What color is this?

Sounds	Position	Picture	Supplemental Clues
Blends			
(gr-)		grass	The lady is standing on the ________ (grass)
(-ld)		gold	This isn't silver, it's ________ (gold)

Errors were classified as omissions, substitutions, or distortions. The distortions were scaled:

1. very mild
2. mild
3. moderate
4. severe
5. very severe

The stimulability section was done for all errors. The child was told:

> I will make the sound (say the word) three times. Listen carefully and say just what I say. Make the sound only once.

Stimulability was done in isolation, in nonsense syllables, and in words; deviations were recorded as omissions, substitutions, or distortions.

The examiner tallied the omissions, substitutions, and distortions for each sound in each position for the achieving and non-achieving groups. The total number of correct productions for each subject was also compiled. The reactions to stimulation for each error were categorized such as:

no change on stimulation;

correct sound in isolation and nonsense syllables, incorrect in words;

correct on stimulation

Eliciting Children's Connected Speech

This procedure was an evaluation of language development using the McCarthy (61) methodology; and an analysis of grammatical errors according to Templin (95). Toys were used[5] to stimulate responses in the primary and intermediate age groups. The subjects in this age group were told:

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[5] See Appendix B.

> I want you to take these toys out of the boxes and play with them any way you like, just as you would if you were at home by yourself. But you must tell me just what you are doing while you play, so I will know (61, p. 34).

With the older children it was necessary to use stimulus pictures which told a story.[6] The child was asked:

> Tell me what is happening in the picture.

Fifty consecutive responses were recorded verbatim. All examiner comments were recorded.

The sentences were analyzed for these variables using McCarthy's methods.[7]

1. mean length of response (total number of words divided by 50);
2. number of one-word responses;
3. the use of the sentence: declarative, interrogative, imperative, or exclamatory;
4. the parts of speech as a percentage of the total words the child used; McCarthy's (61) miscellaneous category was used for non-classifiable words;
5. the completeness of the sentence;
6. the degree of elaboration: compound, complex, compound-complex and elaborated sentences were totaled as Templin (95, p. 103) had done and this figure was compared with simple sentences.

The grammatical errors were divided (95, pp. 96-100) into four categories: colloquialisms and slang, word approximations ('cause for because, etc.), omissions of parts of the sentnece, and structural deviations (non-meaningful sentence, run-on sentence, sentence inverted into a question, error in words in series, error in word order, infantilism, error in pronouns, and error in verbs).

[6] See Appendix B.

[7] See Appendix B.

Social Casework Materials and Procedures

Orientation Conferences

The research staff presented the objectives of the project to consultants, special classroom teachers, and other personnel at the first meeting. This meeting not only served to orient the teachers, administrators, and consultants, but also to clarify questions and crystallize procedures. Groupparticipation finally culminated in setting up specific standard operating procedures and schedules. The project director, the consultants, and the project staff concurred that each school district supervisor should have several days' notification before work would begin in the schools. The psychologist, audiologist and speech pathologist, and social worker met with the superintendents, principals, and the designated coordinators of each school district for further clarification of procedures and simultaneous arrangement for time schedules and needed school facilities.

Casework Procedure

School

During the first two hours of the school day the social worker observed the classes from which the subjects for the project were to be drawn. The educational activities included both informal discussions and formal class instruction. The teacher introduced the social worker who provided a simple explanation for her visit. The children had previously been oriented by the teachers. The project psychologist had already tested the children and had selected those who met the project criteria. The social worker then spent some time with the children in establishing rapport, acquainting them with her, and engendering some feeling of security prior to her home visit. The social worker not only became familiar with the child as an individual, but also obtained some insight in setting up her meeting. The social worker felt her acquaintance with the child was a necessary prerequisite which would permit her to structure her visit. The following observations were recorded:

1. the child's appearance,
2. his sociability both with individuals and with the group,
3. his oral expression,
4. the type of participation and interest in classroom activities.

Social worker-teacher conference.--An hour conference was held with each teacher during which the social worker learned as much as she could about each subject. The social worker's questions were uniform and consistent. The teachers rated the children for emotional stability, emotional maturity, appearance, and prognosis for the future, from 1 to 5 with category 1 presenting the most desirable rating.[8] Through this method the social worker acquainted herself with the teacher's understanding of the child-parent and child-school personnel relationships. She also elicited information concerning the child's social adaptations, interests, aptitudes, academic progress, leadership, and religious manifestations.

The social worker supplemented her school-faculty association through bried conferences with each teacher of special subjects. These teachers contributed information concerning the child's aptitude in their subjects, their knowledge of the child emotionally and socially, and their relationships with the parents.

When the psychologist had selected the children, the social worker, principal, and the teacher prepared a letter dispatched to each parent from the school office requesting permission to have the child participate in the project and for the parents' cooperation in the study. The letter also included a brief statement of the project and requested an appointment for a home visit. In addition, the social worker arranged for a conference with the nurses and procured case history information from the nurses' records. Pertinent information was extracted for the case history from confidential and school records. She also conferred with the regular school psychologist for information that might help her in the development and framework for her interview.

When she felt confident that she had a clear and accurate picture of the child, she telephoned parents to arrange for appointments. At least two interviews, one with each parent, were scheduled. Approximately 2 1/2 hours was allotted for interviews with each mother, and 1 hour for interviews with each father. The mothers were routinely interviewed prior to the interview with the father. The father and mother were interviewed separately. In five instances they were interviewed jointly because of parental insistence.

After her observation in the classroom and prior to her home visit, the worker arranged to meet each child in an informal manner. By this time she had assimilated and synthesized the information from the various sources and had a fair knowledge of the child's history and behavior. During this association with the child the worker attempted to transmit a feeling of anticipation of her visit.

Dynamics involving mother interview time sequence.--An introduction and data sheet[9] occupied 15 minutes of the interview; the Vineland Social Maturity Scale, 45 minutes. The medical and

[8] See Appendix C.

[9] See Appendix C.

social case history[10] consumed the remaining time. The social worker attempted to complete her interview in 2 1/2 hours, but the interview session was never restricted by the time element. For the average mother 2 1/2 hours proved ample.

The Interview

Prior to her appointment with the parent, the social worker noted the dwelling area or neighborhood in which the home was situated and the structure and size of the home. If a night interview became necessary, the social worker checked the neighborhood sometime during the day prior to the visit.

The social worker met the mother and as early as possible established an informal dynamic atmosphere most conducive to a free flow and exchange of communication. The social worker opened the interview with remarks appropriate to an establishment of a satisfactory frame of reference. When rapport had been established, she presented the research project and attempted to allay any anxiety concerning it. Moreover, she clarified the psychologist's and speech pathologist's function in the study. Furthermore, she strongly emphasized the confidential nature of the information as well as the objectivity of the investigation. She assured each parent no evaluation could be made, but that the study might prove to be important in terms of information which it might provide. In addition, she developed a rationale for questions which might not appear to be related to the project. She explained the necessity for recording the information. The parents' information was recorded verbatim whenever possible. The interviewer reported that at a certain point in the session the parent would refrain from asking any questions until the questionnaire battery had been completed. Upon completion of this part of the record-taking, the parent would be free to discuss any related problem.

The sequential parts of the interview followed from questions of factual information to those concerned with emotional content providing a transitional stage for parent adjustment to the interview procedure. The worker continued to transmit a friendly atmosphere which she constantly maneuvered in disrupting resistance and defenses that the parent might offer. In this manner she varied the interview techniques rather than the wording of questions. Above all else, she consciously and constantly avoided manifesting any indication of approval or disapproval but accepted and reflected the parental feeling.

She administered the Vineland Social Maturity Scale. Her next series of questions followed sequentially in exact order from the medical form.[11] A few statements on the medical form had to be completed into sentences or inverted into questions. The interview recording was adjusted to the dynamics of the situation. If the parent provided more information than necessary, this information was recorded in its proper sequence. While the interview

[10] See Appendix C.

[11] See Appendix C.

continued non-directively, the social worker provided the end points and contained it in a proper perspective.

When the parent provided insufficient information and the need for facts on a disease or pattern of behavior was indicated, the worker adjusted the question form more specifically to kinds of illness, details, and other related variables. The worker reread the information to the parent asking: "Is this correct?" "Did I leave anything out?" Many of the interviews disclosed an inability of the parent to remember the developmental sequences on the physical continuum. The parent remembered most accurately the ages of walking and talking.

The Social Case History[12]

Focused interview.--The social worker constructed an interview guide in case history form. General categories were broken down into specific subdivisions. She arranged the questions in funnel-like manner. She utilized open-end questions which were followed with closed questions on specific points contained in the answers to the open-end questions.

Variations.--Ambiguous questions on medical history were presented again in the social history in another form. This permitted the worker to engage in a fluid type of interview which would not threaten the interviewee. Moreover, the social worker found this technique valuable in providing reliability, elaboration, and corroboration of earlier responses.

Upon completion of the social history the social worker removed all the forms into a brief case and signified the end of the interview. She then chatted with the mother to provide the mother with an opportunity to express her feelings. The social worker's role consisted of listening. When the social worker had satisfied herself that the mother manifested no evidence of fears or anxiety and was satisfied with the conduct and the content of the interview, she introduced the topic of an appointment with the father. The social worker introduced the father interview on the basis of a need to include both parents' knowledge and on the premise that soliciting information from both of them would preserve each parent's integrity and self-respect since they were both contributing valuable information.

Father interview.--At a specified time the worker interviewed the father in the home. Although she had a more intimate relationship with the mother and child, the father had been prepared for satisfactory cooperation. On the return visit the family first gathered as a unit and engaged her in informal conversation for 5 or 10 minutes. The same procedure obtained after the interview. In this way the social worker was able to observe familial inter-relationships before, during, and after the interview. Prior to the interview with the father the social worker oriented him to the type of information she had requested from the mother and permitted him an opportunity to volunteer. The conduct of the father interview closely paralleled that of the mother and was identical in the categories set up in the case history on parental attitudes, plans for the future of the child, and family. The interview questions relating to the child's behavior within the family were compared to those of the mother interview and provided an index of agreement between parents. Among the specific questions she included one directed to the father concerning inter-parental agreement or disagreement.

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[12] See Appendix C.

Upon completion of her interviews, the social worker conferred with the school psychologists and teachers in an attempt to complete her records and transmit information related to needs requiring immediate attention.

After the social worker had completed her 100 case histories, 10 case histories were randomly selected and submitted to two professionally employed social workers and two psychologists. These individuals were instructed to read the records independently and reconstruct a profile of the relationships the records revealed to them. There was sufficient agreement on all aspects of the factual categories, and there was more than 80 percent agreement among the four individuals. The four individuals emphasized the same phenomena, but the interpretation of the etiological factors was not completely in agreement. The social worker's interpretation was heavily loaded with analytical theory, while the psychologists evaluated the child-family relationship in inter-behavioral terms. The interpretations heavily reflected the individual's theoretical training.

CHAPTER IV

RESULTS

Psychology

This investigation was designed to discover behavior patterns which would differentiate achievers from non-achievers among non-institutionalized mentally retarded children with intelligence quotients ranging from 60 to 75.

Table 2 presents a comparison of the means, standard deviations, difference between means, t and F values of chronological age

TABLE 2

MEANS, STANDARD DEVIATIONS, DIFFERENCE BETWEEN MEANS, t AND F VALUES OF CHRONOLOGICAL AGE FOR FIFTY ACHIEVING AND FIFTY NON-ACHIEVING[a] MENTALLY RETARDED CHILDREN[b] ON THE REVISED STANFORD-BINET FORM L

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
1	105	122
2	122	126
3	140	112
4	125	144
5	136	130
6	134	129
7	127	120
8	130	127
9	138	157
10	121	124
11	141	156
12	135	142
13	135	138
14	136	164
15	142	153
16	153	171
17	154	175
18	155	153
19	156	185
20	158	160
21	160	112
22	161	111
23	182	161
24	172	186
25	144	161
26	172	160
27	170	157
28	183	212
29	188	178
30	140	185

TABLE 2--Continued

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
31	166	184
32	174	173
33	147	149
34	161	186
35	168	187
36	151	188
37	154	190
38	192	170
39	181	191
40	191	155
41	161	146
42	185	140
43	172	149
44	173	149
45	177	175
46	192	183
47	189	183
48	195	151
49	220	175
50	205	161
$\bar{X}$	159.38	157.92
σ	24.64	24.42
D		1.46
t		.30
F		1.02

[a] Unless otherwise specified, the population consisted of 50 achievers and 50 non-achievers.

[b] Hereafter referred to as achievers and non-achievers.

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

for 50 achieving and 50 non-achieving mentally retarded children on the Revised Stanford-Binet Intelligence Scale Form L. The mean age in months for the achievers was 159.38, while the mean age for the non-achievers was 157.92. Both the *t* and F values were not statistically significant indicating that when chronological age was considered the two groups were similar. When the chronological ages were corrected for the achievers and non-achievers according to Stanford-Binet procedure, the corrections did not alter the difference in mean ages between the groups. Table 3 presents the means, variances, difference between means, *t* and F values of corrected chronological age for achievers and non-achievers on the Stanford-Binet Intelligence Scale. The mean age in months for the achievers was 154.60 and for the non-achievers, 154.02. Both the *t* and F values revealed no statistically significant difference between the groups when corrected for chronological age. Table 4 exhibits a comparison of the means, standard deviations, difference between means, *t* and F values of mental age for achievers and non-achievers on the Revised Stanford-Binet Form L. The mean age in months for the achievers was 100.52, and for the non-achievers, 102.88. The *t* and F values of .84 and 1.06 respectively indicated no differences between the groups. Table 5 presents a comparison of the means, standard deviations, difference between means, *t* and F values of intelligence quotient for achievers and non-achievers. The mean intelligence quotient for the achievers was 65.94, and for the non-achievers, 67.80, resulting in a difference score of -1.86. The *t* and F values presented no significant differences between the groups. Table 6 indicates the means, variances, difference between means, *t* and F values of number of year levels for achievers and non-achievers on the Stanford-Binet Intelligence Scale. The difference of .54 with its corresponding

TABLE 3
MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES OF CORRECTED CHRONOLOGICAL AGE FOR ACHIEVERS AND NON-ACHIEVERS ON THE STANFORD-BINET INTELLIGENCE SCALE FORM L

Group	$\bar{X}$	σ^2	D	*t*	F
Achievers (N = 50)	154.60	364.08	.58	.15	1.10
Non-Achievers (N = 50)	154.02	401.78			

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 4

MEANS, STANDARD DEVIATIONS, DIFFERENCE BETWEEN MEANS, t AND F VALUES OF MENTAL AGE FOR ACHIEVERS AND NON-ACHIEVERS ON THE REVISED STANFORD-BINET FORM L

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
1	76	78
2	78	78
3	84	80
4	82	86
5	82	88
6	82	88
7	84	90
8	84	88
9	84	96
10	84	86
11	90	94
12	92	96
13	94	98
14	90	96
15	98	100
16	96	100
17	94	100
18	98	102
19	94	102
20	96	108
21	94	76
22	96	76
23	100	100
24	98	110
25	102	104
26	102	104
27	106	106
28	100	106
29	110	114
30	104	114
31	104	122
32	112	120
33	88	112
34	96	124
35	100	128

TABLE 4--Continued

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
36	100	122
37	110	128
38	108	122
39	110	128
40	124	94
41	112	92
42	116	104
43	112	102
44	116	106
45	116	106
46	120	108
47	124	112
48	128	110
49	128	122
50	128	118
$\overline{X}$	100.52	102.88
σ	13.90	14.30
D	-2.36	
t	.84	
F	1.06	

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 5

MEANS, STANDARD DEVIATIONS, DIFFERENCE BETWEEN MEANS, t AND F VALUES OF INTELLIGENCE QUOTIENT FOR ACHIEVERS AND NON-ACHIEVERS ON THE REVISED STANFORD-BINET FORM L

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
1	72	64
2	64	62
3	60	71
4	66	60
5	60	68
6	61	68
7	66	75
8	65	69
9	61	61
10	69	69
11	63	60
12	68	68
13	70	71
14	66	60
15	69	65
16	63	61
17	61	61
18	63	67
19	60	60
20	61	68
21	60	68
22	61	68
23	60	63
24	60	65
25	71	66
26	63	66
27	65	68
28	60	62
29	65	69
30	74	67
31	65	72
32	68	74
33	60	75
34	61	73
35	62	75

TABLE 5--Continued

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
36	66	72
37	71	75
38	63	75
39	66	75
40	73	61
41	71	63
42	69	74
43	69	68
44	71	71
45	70	64
46	70	64
47	73	67
48	74	73
49	74	74
50	74	75
$\overline{X}$	65.94	67.80
σ	4.97	4.71
D		-1.86
t		1.92
F		1.11

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 6

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES OF NUMBER OF YEAR LEVELS FOR ACHIEVERS AND NON-ACHIEVERS ON THE STANFORD-BINET INTELLIGENCE SCALE FORM L

Group	$\bar{X}$	σ^2	D	*t*	F
Achievers (N = 50)	6.14	2.20	.54	1.69	1.32
Non-Achievers (N = 50)	6.68	2.92			

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

t and F values revealed no statistically significant difference between the means. Table 7 presents the means, variances, difference between means, *t* and F values for number of vocabulary words correct

TABLE 7

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES OF NUMBER OF VOCABULARY WORDS CORRECT FOR ACHIEVERS AND NON-ACHIEVERS ON THE STANFORD-BINET INTELLIGENCE SCALE FORM L

Group	$\bar{X}$	σ^2	D	*t*	F
Achievers (N = 50)	10.54	8.34	.10	.18	1.14
Non-Achievers (N = 50	10.64	7.34			

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

for achievers and non-achievers on the Stanford-Binet Intelligence Scale. A D value of .10 exhibited a very small difference and the *t* and F values unequivocally exhibited no significant differences between the means. Table 8 indicates the relationship with respect to the vocabulary age with the achievers and non-achievers on the Stanford-Binet Intelligence Scale. The *t* and F values again were not significantly different. Table 9 reveals no significant

TABLE 8

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES OF VOCABULARY AGE[a] FOR ACHIEVERS AND NON-ACHIEVERS ON THE STANFORD BINET INTELLIGENCE SCALE FORM L

Group	$\bar{X}$	σ^2	D	*t*	F
Achievers (N = 50)	116.80	584.49	.72	.15	1.15
Non-Achievers (N = 50)	117.52	508.66			

[a] Age in months.

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 9

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES OF TOTAL MENTAL VOCABULARY AGE[a] FOR ACHIEVERS AND NON-ACHIEVERS ON THE STANFORD-BINET INTELLIGENCE SCALE FORM L

Group	$\bar{X}$	σ^2	D	*t*	F
Achievers (N = 50)	16.28	264.00	1.64	.52	1.13
Non-Achievers (N = 50)	14.64	233.54			

[a] Age in months.

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

differences between the groups with respect to total mental vocabulary age on the Stanford-Binet Intelligence Scale.

Table 10 presents a comparison of the means, standard deviations, difference between means, t and F values of achievement level for achievers and non-achievers on the Metropolitan Achievement Test.

TABLE 10

MEANS, STANDARD DEVIATIONS, DIFFERENCE BETWEEN MEANS, t AND F VALUES OF ACHIEVEMENT LEVEL FOR ACHIEVERS AND NON-ACHIEVERS ON THE METROPOLITAN ACHIEVEMENT TEST

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
1	74	66
2	81	66
3	86	66
4	80	66
5	100	78
6	88	66
7	82	80
8	87	77
9	82	84
10	92	76
11	98	70
12	96	85
13	104	88
14	88	82
15	97	83
16	100	88
17	99	85
18	102	92
19	96	91
20	106	96
21	109	66
22	100	66
23	102	90
24	100	95
25	110	94
26	101	92
27	104	89
28	98	96
29	138	95
30	107	85
31	104	104
32	111	104
33	95	102
34	112	110
35	98	104

TABLE 10--Continued

Subjects	Achievers (N = 50)	Non-Achievers (N = 50)
36	101	100
37	110	110
38	113	112
39	118	111
40	122	84
41	115	82
42	115	92
43	111	90
44	116	92
45	136	96
46	137	98
47	134	97
48	133	98
49	146	107
50	126	102
$\bar{X}$	105.20	88.96
σ	16.39	13.31
D		16.24
t		5.44**
F		1.52

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

The mean educational achievement age in months for achievers was 105.20 and for non-achievers 88.96. The difference score of 16.24 months with a t value of 5.44 indicated a significant difference between the groups beyond the .01 level of confidence.

Table 11 reviews the means, variances, differences between means, t and F values on the Metropolitan Achievement Batteries and subtests for achieving and non-achieving groups of mentally retarded children. Examination of Table 11 reveals significant t values beyond the .01 level of confidence for the Word-Picture, Word-Recognition, Word-Meaning, and Numbers subtests on the Primary I Battery. Table 11 also shows significant t values beyond the .01 level of confidence for Reading Arithmetic Problems, Spelling, Word-

TABLE 11

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES ON THE METROPOLITAN ACHIEVEMENT BATTERIES AND SUBTESTS FOR ACHIEVERS AND NON-ACHIEVERS

Battery	Subtest	Achievers			Non-Achievers			D	t	F
		N	$\bar{X}$	σ^2	N	$\bar{X}$	σ^2			
Primary I	Word Picture	17	92.06	106.56	14	75.07	100.38	16.99	4.62**	1.06
	Word Recognition	17	93.18	98.28	14	76.93	60.84	16.25	4.99**	1.62
	Word Meaning	17	90.47	240.01	14	73.07	31.30	17.40	3.98**	7.67**
	Numbers	17	88.53	144.76	14	72.14	268.13	16.39	3.21**	1.85
Primary II and Elementary and Intermediate	Reading	33	111.06	101.75	36	97.39	57.39	13.67	6.40**	1.77
	Arithmetic Fundamentals	33	113.70	271.66	36	105.31	151.88	8.39	2.41*	1.79
	Arithmetic Problems	33	109.09	346.90	36	94.75	168.65	14.34	3.74**	2.06
	Spelling	32	118.81	380.42	36	94.11	105.24	24.70	6.64**	3.61**
	Word Meaning	16	103.44	68.80	11	83.09	155.49	20.35	5.11**	2.26
	Vocabulary	17	118.12	194.49	25	96.48	160.18	21.64	5.22**	1.21
	AF - AP	33	4.61	121.50	36	10.56	98.65	-5.95	-2.36*	1.23

N_1	N_2	t				F							
						σ_1^2 Larger				σ_2^2 Larger			
		Actual df	Table df	** .01	* .05	Actual df	Table df	** .01	* .05	Actual df	Table df	** .01	* .05
17	14	29	29	2.76	2.05	16/13	15/12	4.72	3.18	13/16	12/15	4.25	2.96
33	36	67	65	2.65	2.00	32/35	30/30	2.63	2.07	35/32	30/30	2.63	2.07
32	36	66	65	2.65	2.00	31/35	30/30	2.63	2.07	35.31	30/30	2.63	2.07
16	11	25	25	2.79	2.06	15/10	15/10	5.47	3.52	10/15	10/15	4.42	3.06
17	25	40	40	2.70	2.02	16/24	15/24	3.25	2.44	24/16	24/15	3.79	2.70

Meaning, and Vocabulary, while the t value for Arithmetic-Fundamentals proves significant at the .05 level. When a comparison was computed between the means for differences between Arithmetic Fundamentals and Arithmetic Problems for the Primary II, Elementary and Intermediate Batteries employing 67 degrees of freedom, the t value of 2.36 proved to be significant at the .05 level. This would support previous findings that even the achievers scored higher on Arithmetic Fundamentals than they did on problem solving, but they still differed from the non-achievers. This performance is further illustrated by the t value of 2.40 in Table 12 for the achievers, significant at the .05 level, while a t value of 6.38 indicated a significant difference beyond the .01 level for the non-achievers.

TABLE 12

MEANS, MEAN DIFFERENCES, CORRELATED t VALUES AND DEGREES OF FREEDOM FOR ARITHMETIC FUNDAMENTALS AND ARITHMETIC PROBLEMS FOR ACHIEVERS AND NON-ACHIEVERS ON THE METROPOLITAN ACHIEVEMENT TEST

Group	Arithmetic		$\overline{D}$	t	df
	Fundamentals	Problems			
	$\overline{X}$	$\overline{X}$			
Achievers (N = 50)	113.70	109.09	4.61	2.40*	32
Non-Achievers (N = 50)	105.31	94.75	10.56	6.38**	35

df	t .01**	t .05*
32	2.74	2.04
35	2.73	2.03

Table 13 presents the means, variances, difference between means, t and F values for chronological age, mental age, intelligence quotient and number of year levels for the performance of 50 achieving and 50 non-achieving mentally retarded children on the Revision of the Leiter International Performance Scale (1948). All of the t and F values for chronological age, mental age, intelligence quotient, and number of year levels suggest that the Revision of the Leiter International Performance Scale (1948) does not differentiate the achievers from the non-achievers more effectively than the Stanford-Binet. Inspection of the intelligence quotients on the Stanford-Binet and the Leiter reveals that the Leiter scored the achievers approximately 5.5 points lower than the Stanford-Binet, and almost 7 points lower for the non-achievers.

Table 14 gives the chi square value for the number of achievers and non-achievers identifying positively on the Draw-A-Person Test. Four more achievers than non-achievers identified

TABLE 13

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR CHRONOLOGICAL AGE, MENTAL AGE, INTELLIGENCE QUOTIENT, AND NUMBER OF YEAR LEVELS FOR THE PERFORMANCE OF ACHIEVERS AND NON-ACHIEVERS ON THE REVISION OF THE LEITER INTERNATIONAL PERFORMANCE SCALE (1948)

	Group	X	σ^2	D	t	F
Chronological Age	Achievers (N = 50)	148.32	144.79	.92	.35	1.33
	Non-Achievers (N = 50)	147.40	192.86			
Mental Age	Achievers (N = 50)	89.58	274.78	.18	.05	1.06
	Non-Achievers (N = 50)	89.76	291.98			
Intelligence Quotient	Achievers (N = 50)	60.30	79.36	.52	.28	1.18
	Non-Achievers (N = 50)	60.82	93.78			
Number of Year Levels	Achievers (N = 50)	5.52	2.05	.24	.84	1.02
	Non-Achievers (N = 50)	5.28	2.00			

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 14

NUMBER OF ACHIEVERS AND NON-ACHIEVERS IDENTIFYING POSITIVELY ON THE DRAW-A-PERSON TEST

Identification	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Positive	38	34	0.22

df	P .01**	P .05*
1	6.64	3.84

positively; 12 achievers and 16 non-achievers identified negatively. The chi square value of 0.22 indicated that the distribution of positive choices did not permit the rejection of the null hypothesis.

The means, variances, difference between means, t and F values for cards and categories on the Bender Motor Gestalt Test are exhibited in Table 15. Examination of the table suggests that only 5 significant F's appear at the .01 level of confidence. This would indicate that non-achievers were more varied on Card 1 with respect to the contact category, on Card 2, for orientation; on the number category, for total score; number of cards completely passed; and number of cards completely failed. But such an interpretation is not warranted, since in a test containing so many F's, 5 percent may be expected to prove significant by chance.

Table 16 reveals 3 F values significant at the .01 level on the Draw-A-Man Test. None of the t values were significant and on examination, the differences between the means, with the exception of mental age, were less than one. A comparison of the means between the achievers and non-achievers on chronological age, mental age, intelligence quotient and raw scores indicates small differences; nevertheless, the F values significant beyond the .01 level suggest greater variability between the groups. This suggestion is made with caution and may not be entirely warranted. Comparison of the intelligence quotients on the Draw-A-Man and the Stanford-Binet shows that the Draw-A-Man and the Stanford-Binet scored both achievers and non-achievers approximately equal.

Investigation and evaluation of the performances of the achievers and non-achievers on the Rorschach Psychodiagnostic Test raised a series of complex issues. Analysis employing statistics assumes that variables are independent and are distributed normally among the population. A most crucial controversy has evolved about the assumption that personality traits are not independent and not equally distributed, and, consequently, resist the application of statistical measurements which require the normal distribution of continuous variables.

TABLE 15

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR CARDS AND SUBCATEGORIES FOR ACHIEVERS AND NON-ACHIEVERS ON THE BENDER MOTOR GESTALT TEST

Card	Subcategory	Achievers (N = 50)		Non-Achievers (N = 50)		D	*t*	F
		$\overline{X}$	σ^2	$\overline{X}$	σ^2			
A	Orientation	.84	.14	.78	.18	.06	.76	1.28
	Distortion	.16	.14	.16	.14	.00	.00	1.00
	Number	1.00	.00	.94	.06	.06	1.77	.00
	Contact	.56	.25	.38	.24	.18	1.81	1.05
	Gestalt	.02	.02	.02	.02	.00	.00	1.00
	Total	2.58	.62	2.28	.98	.30	1.68	1.59
1	Orientation	.68	.22	.66	.23	.02	.21	1.03
	Distortion	.26	.20	.22	.18	.04	.46	1.12
	Number	.94	.06	.90	.09	.04	.73	1.59
	Contact	.94	.06	.98	.02	-.04	1.02	2.88**
	Gestalt	.12	.11	.14	.12	-.02	.29	1.14
	Total	2.94	1.08	2.90	.99	.04	.20	1.09
2	Orientation	.08	.08	.02	.02	.06	1.38	3.76**
	Distortion	.58	.25	.46	.25	.12	1.20	1.02
	Number	.84	.14	.80	.16	.04	.52	1.19
	Contact	.82	.15	.84	.14	-.02	.26	1.10
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	2.32	.79	2.12	.96	.20	1.07	1.22
3	Orientation	.30	.21	.38	.24	-.08	.84	1.12
	Distortion	.20	.16	.20	.16	.00	.00	1.00
	Number	.92	.08	.88	.11	.04	.66	1.44
	Contact	.90	.09	.84	.14	.06	.89	1.49
	Gestalt	.06	.06	.06	.06	.00	.00	1.00
	Total	2.38	2.24	2.36	1.21	.02	.08	1.84*

TABLE 15--*Continued*

Card	Subcategory	Achievers (N = 50)		Non-Achievers (N = 50)		D	*t*	F
		$\bar{X}$	σ^2	$\bar{X}$	σ^2			
4	Orientation	.50	.26	.56	.25	-.06	.60	1.01
	Distortion	.40	.24	.50	.26	-.10	1.00	1.04
	Number	1.00	.00	.98	.02	.02	1.00	.00
	Contact	.36	.24	.40	.24	-.04	.41	1.04
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	2.26	1.38	2.46	1.31	-.20	.86	1.05
5	Orientation	.38	.24	.54	.25	-.16	1.61	1.05
	Distortion	.16	.14	.12	.11	.04	.57	1.27
	Number	.60	.24	.42	.25	.18	1.81	1.02
	Contact	.72	.21	.82	.15	-.10	1.18	1.37
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	1.88	1.25	1.90	1.11	-.02	.09	1.12
6	Orientation	.58	.25	.54	.25	.04	.40	1.02
	Distortion	.58	.25	.60	.24	-.02	.20	1.02
	Number	.82	.15	.70	.21	.12	1.40	1.42
	Contact	.38	.24	.26	.20	.12	1.28	1.22
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	2.36	1.05	2.10	1.48	.26	1.16	1.41
7	Orientation	.26	.20	.30	.21	-.04	.44	1.09
	Distortion	.06	.06	.10	.09	-.04	.73	1.59
	Number	.98	.02	.98	.02	.00	.00	1.00
	Contact	.58	.25	.74	.20	-.16	1.70	1.27
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	1.88	.80	2.12	.72	-.24	1.38	1.11

TABLE 15--Continued

Card	Subcategory	Achievers (N = 50) $\bar{X}$	Achievers (N = 50) σ^2	Non-Achievers (N = 50) $\bar{X}$	Non-Achievers (N = 50) σ^2	D	t	F
8	Orientation	.78	.18	.84	.14	-.06	.76	1.28
	Distortion	.08	.08	.06	.06	.02	.39	1.30
	Number	1.00	.00	.98	.02	.02	1.00	.00
	Contact	.54	.25	.32	.22	.22	2.26*	1.14
	Gestalt	.00	.00	.00	.00	.00	.00	.00
	Total	2.42	.66	2.20	.45	.22	.49	1.13
Sub Total		21.02	32.31	20.44	36.46	.58	.49	1.13
Organization score		1.20	4.65	.80	3.43	.40	1.00	1.36
Total score		22.22	44.66	21.24	46.10	.98	.73	1.03
Total Per Subject	Orientation	4.36	3.70	4.60	4.98	-.24	.58	1.34
	Distortion	2.50	3.40	2.40	3.18	.10	.28	1.07
	Number	8.10	1.11	7.60	2.24	.50	1.93	2.02**
	Contact	5.80	4.53	5.56	3.07	.24	.62	1.48
	Gestalt	.24	.39	.24	.23	.00	.00	1.72*
Number of perseverations		.28	.37	.24	.35	.04	.33	1.06
Number of cards completely passed		.18	.27	.14	.12	.04	.45	2.22**
Number of cards completely failed		.28	.49	.50	1.23	-.22	1.18	2.51**
Number of organization scores		.24	.19	.16	.14	.08	.99	1.36

	Actual df	Table df	.01**	.05*
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

TABLE 16

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR CHRONOLOGICAL AGE, MENTAL AGE, INTELLIGENCE QUOTIENT, AND RAW SCORES FOR THE PERFORMANCE OF ACHIEVERS AND NON-ACHIEVERS ON THE DRAW-A-MAN TEST

	Group	$\bar{X}$	σ^2	D	*t*	F
Chronological Age	Achievers (N = 50)	147.80	154.53	.70	.26	1.29
	Non-Achievers (N = 50)	147.10	198.70			
Mental Age	Achievers (N = 50)	97.46	244.66	1.42	.36	2.18**
	Non-Achievers (N = 50)	98.88	534.11			
Intelligence Quotient	Achievers (N = 50)	66.36	79.46	.82	.34	2.61**
	Non-Achievers (N = 50)	67.18	207.50			
Raw Scores	Achievers (N = 50)	20.66	27.29	.30	.23	2.17**
	Non-Achievers (N = 50)	20.96	59.35			

	Actual df	Table df	.01**	.05**
t	98	98	2.63	1.98
F	49/49	50/60	1.96	1.67

Cronbach (25) strongly advocated that various scoring categories are not distributed normally; they are not additive and cannot be treated with statistics assuming normality of distribution without violating the data. Cronbach (25), Fiske and Baughman (30) also insisted that most of the category scores on the Rorschach are influenced by the productivity of the subject and that the frequencies in most categories are related to the total R. They, therefore, discourage comparison of groups with different total R's.

Another objection raised is that by quantification of Rorschach responses clinically qualitative data may be lost. An FM score assigned to "a rabbit hopping" and "a tiger killing" treats them both equally on a quantitative level but does not preserve the different meanings when both are treated only as animal movement scores. These criticisms present serious obstacles in the employment of quantified statistical tools. Nevertheless, other interpretations are possible, since the use of an instrument which does not lend itself to a statistical measure may depend upon the training and inclinations of the examiner and, consequently, does not permit commonality of possession. The validity and reliability of such an instrument introduces speculation as to its efficacy.

It was considered advisable to submit the data to statistical analysis. Twenty-six F values, statistically significant at either the .05 or .01 levels of confidence, were obtained. There were 18 F values below the .01 level of confidence and the remaining 8 at the .05. The analysis also revealed 8 _t_ values at either the .05 or the .01 level of confidence. Five of the significant _t_ values corresponded with significant F values. The interpretation of the significant _t_ and F values must be considered with caution, and for this reason are not presented in table form. Also, the statistically significant _t_ and F values when evaluated from empirical and clinical criteria were not operationally meaningful or significant in differentiating the groups.

Because of the limitation of time, it will not be possible to consider many categories. Nevertheless, the F category exhibited some interesting characteristics. Computation for the F category revealed a significant F value at the .05 level of confidence reflecting greater variance for the non-achievers.

Examination of the profiles for both achievers and non-achievers disclosed remarkable similarity between the groups. The protocols of the achievers and non-achievers considered as a whole exhibited:

1. an over-all restricted stereotyped record,
2. form content reflecting inferior reality testing,
3. organizational ability suffered in terms of their perceptual unification of the total blot.

The above support the findings of Bochner and Halpern (16).

TABLE 17

LOCATION SCORES AND TOTAL RESPONSES OF ACHIEVERS AND NON-ACHIEVERS COMPARED WITH EIGHT-YEAR-OLDS IN THE AMES STUDY (4)

Group	W	Total W	D	Dd	All Dd	S	All S[a]	R
Normals[b]	5.70	7.88	6.64	.62	1.34	.32	1.00	15.86
Achievers (N = 50)	4.88	5.44	8.48	.70	.74	.08	.72	14.84
Non-Achievers (N = 50)	4.78	5.20	8.14	.66	.88	.22	.66	14.39

[a] Ames study, all S = S+WS (see Ames study, Table 16, p. 60, 8 year column). Present investigation, all S = S+WS+DS; DS for achievers = .24; DS for non-achievers = .22.

[b] Normal group standard based on Ames study.

TABLE 18

DETERMINANT SCORES OF ACHIEVERS AND NON-ACHIEVERS COMPARED WITH EIGHT-YEAR OLDS IN THE AMES STUDY (4)

Group	M	FM	m	FC	CF	C	Texture + Vista	Achromatic[a]	F[b]	F+[c]
Normals[d]	1.34	1.54	.40	.54	.90	.44	.92	.24	7.20	6.26
Achievers (N = 50)	1.38	2.34	.36	.64	.64	.24	.30	.18	9.66	8.72
Non-Achievers (N = 50)	1.16	2.12	.40	.50	.68	.04	.44	.42	9.62	8.48

[a] Ames study, average number of F CLOB+average number of CLOBF. Present investigation, FC'+C'F.

[b] Number of F for Ames study computed by multiplying F percent (58 percent) by total R (15.86), (See Ames study, Table 12, p. 50, 8 year column.)

[c] Number of F+ for Ames study computed by multiplying F+ percent (87 percent) by total number of F (see Ames study, Table 12, p. 50, 8 year column).

[d] Normal group standard based on Ames study.

TABLE 19

CONTENT SCORES OF ACHIEVERS AND NON-ACHIEVERS COMPARED WITH EIGHT-YEAR-OLDS IN THE AMES STUDY (4)

Group	A	Ad	A+Ad	H	Hd	H+Hd	(H)	Total All H	At[a]	P	Refus-als	Blood	Fire[b]
Normals[c]	6.38	.90	7.28	1.48	.56	2.04	.56	2.60	.90	3.70	.46	.18	.22
Achievers (N = 50)	8.04	1.04	9.08	1.24	.20	1.44	.56	2.00	.28	3.22	.86	.06	.30
Non-Achievers (N = 50)	7.42	1.28	8.70	1.16	.66	1.82	.50	2.32	.52	3.34	.88	.12	.10

[a] For present investigation, At = HAt + At; Aat for achievers = .08; Aat for non-achievers = .14.

[b] For present investigation, Fire = Fire + Explosions.

[c] Normal group standard based on Ames study.

Tables 17, 18, and 19 present the location scores and total responses, determinant, and content scores for the achievers and non-achievers compared with 8-year-olds in the study by Ames et al. (4). Figures 3 4, 5, and 6 present this information in graphic form. Tables 17, 18, and 19; and Figures 3, 4, 5, and 6 reveal similarities and also contain differences between the achievers and non-achievers when compared with the Ames study. But, since the Rorschach is not standardized on mentally retarded children, these differences cannot be interpreted with any degree of confidence until future studies are specifically designed and executed to establish norms for both normal and mentally retarded populations. Sarason (77) also raises an important question in employing the Rorschach among mentally retarded children, especially when the influence of chronological age is not determined in the evaluation of the data.

Analysis of the protocols also suggests the hypothesis that the groups differed in their preferences for the chromatic and achromatic cards. (At the completion of each Rorschach the examiner placed on the testing table all 10 Rorschach cards in the order presented in the test, and asked the subject to point to the one he liked the best and the one he liked the least.) Table 20 presents the distribution of preferences for the chromatic and achromatic cards in each group. Thirty-two preferred the chromatic while 18 preferred the achromatic cards. The non-achievers preferred the cards in exactly the same numbers as the achievers. Since no difference existed between the two groups, the computation of chi square was zero and would indicate the two groups were precisely alike in their preference for chromatic and achromatic cards. With respect to the cards disliked, 17 achievers disliked

TABLE 20

NUMBER OF CHOICES OF CHROMATIC AND ACHROMATIC CARDS BETWEEN ACHIEVERS AND NON-ACHIEVERS ON THE RORSCHACH PSYCHODIAGNOSTIC TEST

Card Preference	Achievers (N = 50)		Non-Achievers (N = 50)		χ^2
	Chromatic	Acromatic	Chromatic	Acromatic	
Liked	32	18	32	18	0.00
Disliked	17	33	18	32	0.04

df	$\chi^2_{.01}$**	$\chi^2_{.05}$*
1	6.64	3.84

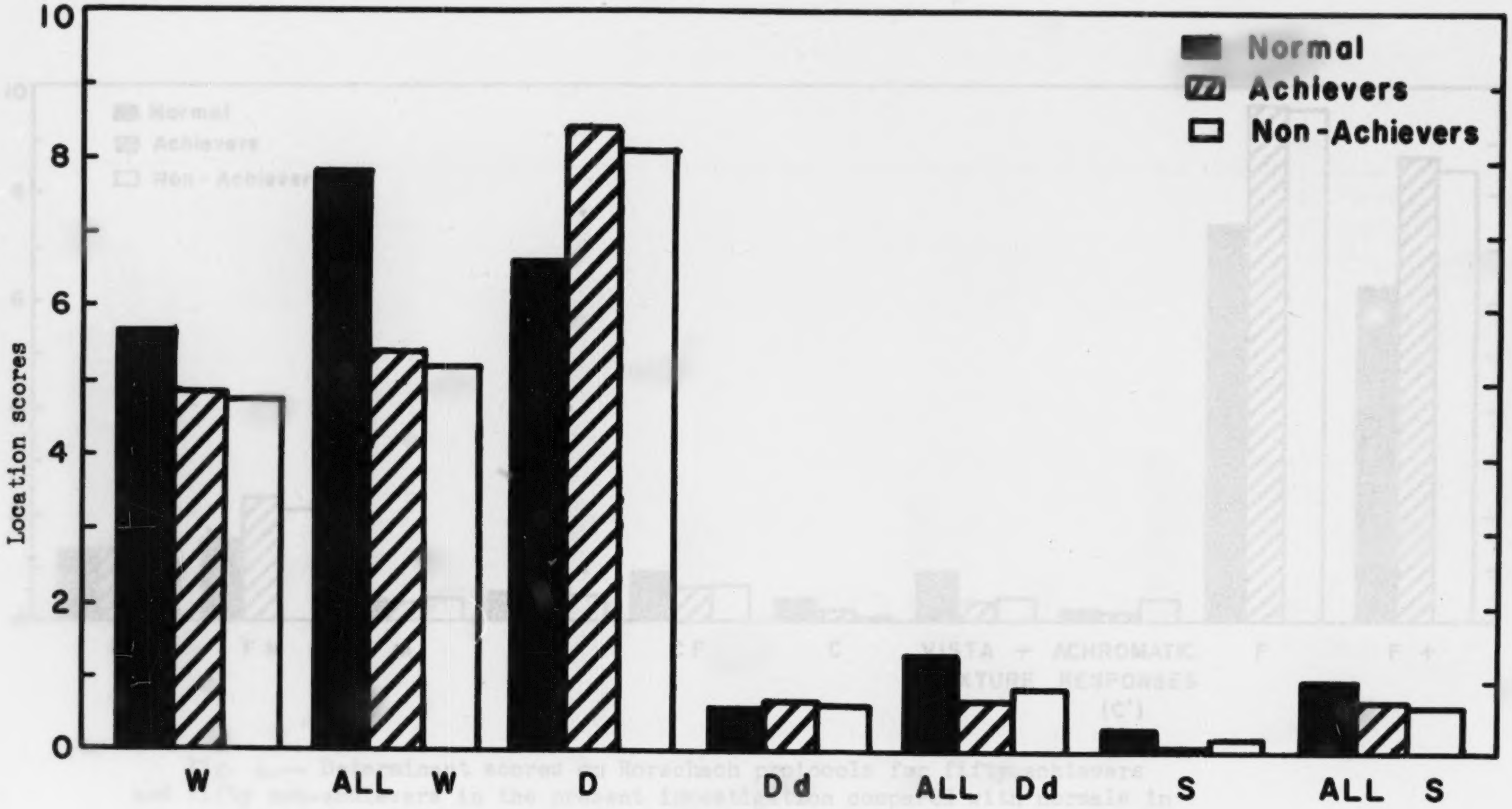

Fig. 3.--Location scores on Rorschach protocols for fifty achievers and fifty non-achievers in the present investigation compared with normals in the Ames study.

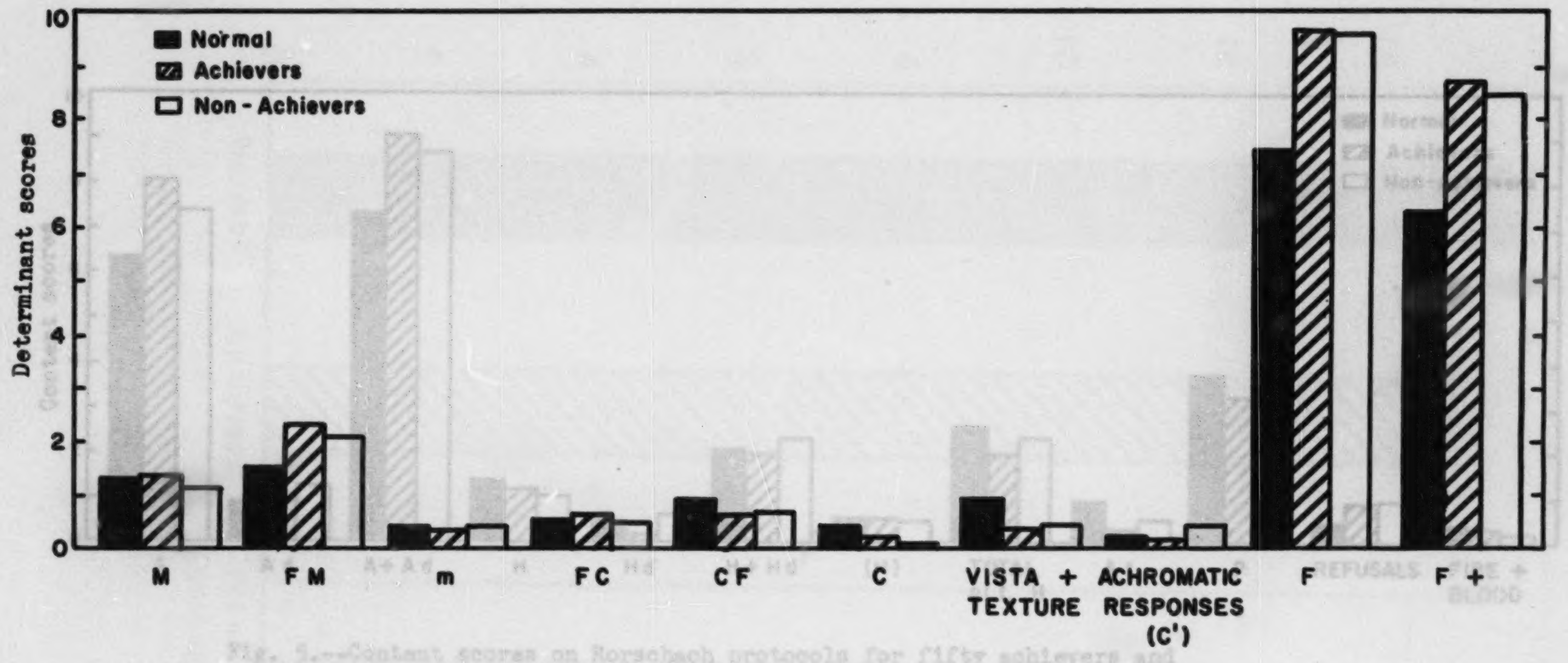

Fig. 4.-- Determinant scores on Rorschach protocols for fifty achievers and fifty non-achievers in the present investigation compared with normals in the Ames study.

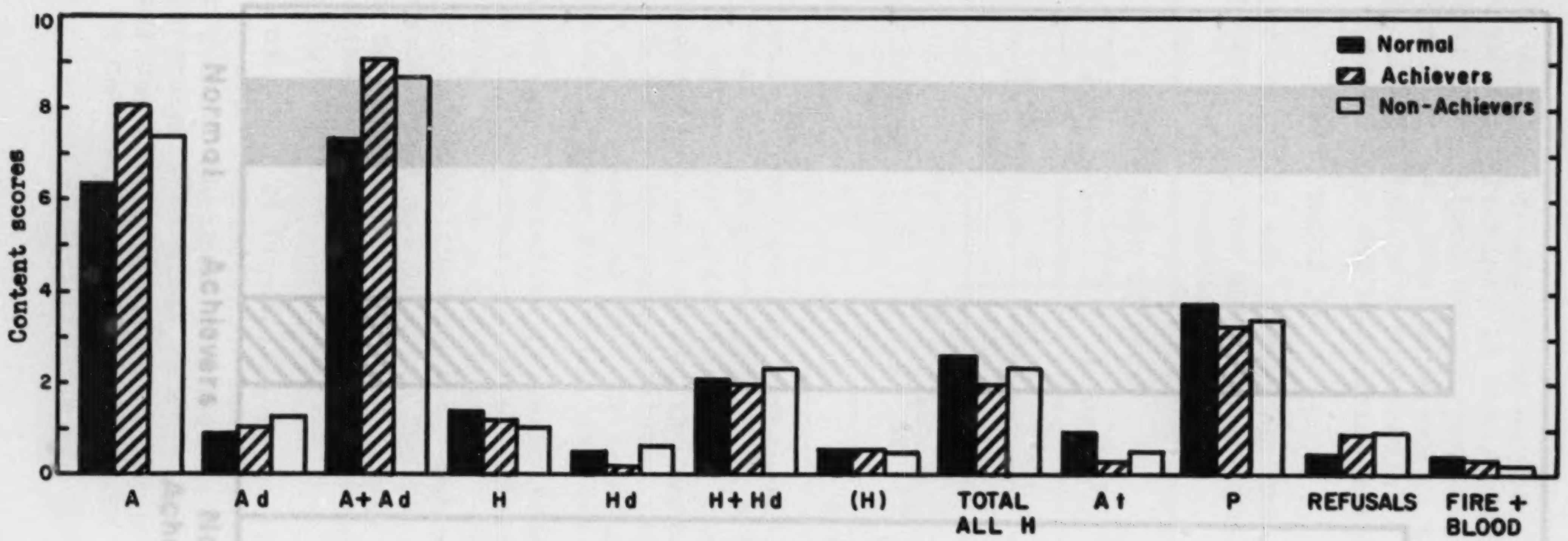

Fig. 5.--Content scores on Rorschach protocols for fifty achievers and fifty non-achievers in the present investigation compared with normals in the Ames study.

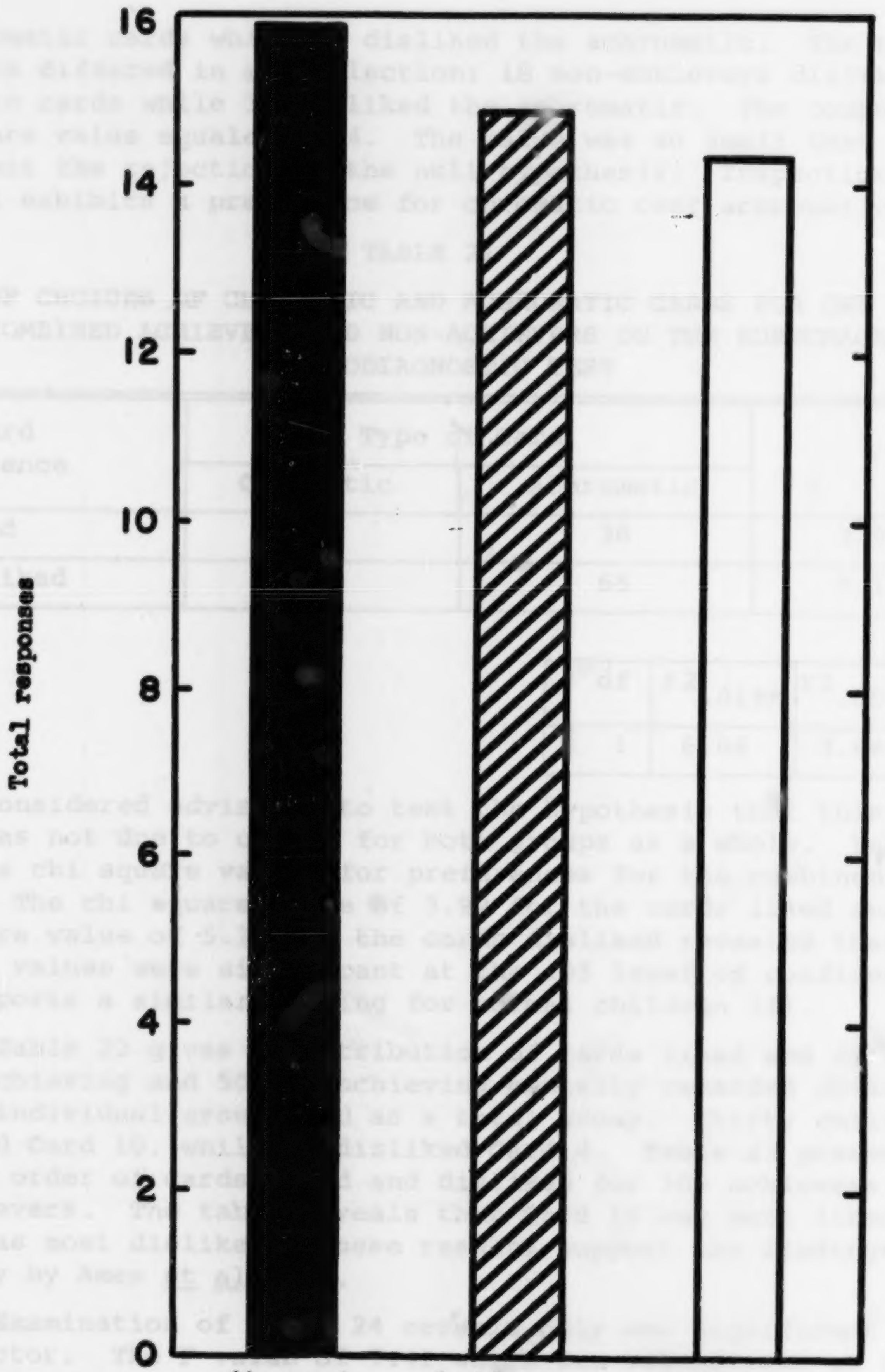

Fig. 6.—Total responses on Rorschach protocols for fifty achievers and fifty non-achievers in the present investigation compared with normals in the Ames study.

the chromatic cards while 33 disliked the achromatic. The non-achievers differed in one selection; 18 non-achievers disliked the chromatic cards while 32 disliked the achromatic. The computed chi square value equaled 0.04. The value was so small that it did not permit the rejection of the null hypothesis. Inspection of Table 21 exhibits a preference for chromatic over achromatic cards.

TABLE 21

NUMBER OF CHOICES OF CHROMATIC AND ACHROMATIC CARDS FOR ONE HUNDRED COMBINED ACHIEVERS AND NON-ACHIEVERS ON THE RORSCHACH PSYCHODIAGNOSTIC TEST

Card Preference	Type of Card		χ^2
	Chromatic	Achromatic	
Liked	64	36	3.92*
Disliked	35	65	5.12*

df	$\chi^2_{.01}$**	$\chi^2_{.05}$*
1	6.64	3.84

It was considered advisable to test the hypothesis that this preference was not due to chance for both groups as a whole. Table 21 shows the chi square values for preferences for the combined groups. The chi square value of 3.92 for the cards liked and the chi square value of 5.12 for the cards disliked revealed that both of these values were significant at the .05 level of confidence. This supports a similar finding for normal children (4).

Table 22 gives a distribution of cards liked and disliked for 50 achieving and 50 non-achieving mentally retarded children both as individual groups and as a total group. Thirty children preferred Card 10, while 33 disliked Card 4. Table 23 presents the rank order of cards liked and disliked for 100 achievers and non-achievers. The table reveals that Card 10 was most liked and Card 4 was most disliked. These results support the findings of the study by Ames _et al_. (4).

Examination of Table 24 reveals only one significant F on the V factor. The F value of 7.41 which was significant at the .05 level might suggest greater variance for the non-achievers. This finding must be interpreted with great caution, since one significant F value at only the .05 level among 18 values could be expected to happen by chance. All of the _t_ values were low. The

TABLE 22

DISTRIBUTION OF RORSCHACH CARDS LIKED AND DISLIKED FOR ACHIEVERS AND NON-ACHIEVERS BOTH AS INDIVIDUAL GROUPS AND AS A TOTAL GROUP

Card	Achievers (N = 50)		Non-Achievers (N = 50)		Achievers + Non-Achievers (N = 100)	
	Number Liked	Number Disliked	Number Liked	Number Disliked	Number Liked	Number Disliked
1	7	8	5	5	12	13
2	2	3	3	3	5	6
3	4	5	4	3	8	8
4	1	15	1	18	2	33
5	5	3	9	1	14	4
6	2	3	0	4	2	7
7	3	4	3	4	6	8
8	5	3	4	3	9	6
9	5	1	7	1	12	2
10	16	5	14	8	30	13
Total Choices	50	50	50	50	100	100

TABLE 23

RANK ORDER FROM MOST TO LEAST OF RORSCHACH CARDS LIKED AND DISLIKED BY ONE HUNDRED ACHIEVERS AND NON-ACHIEVERS

Rank Order	Card Liked	Rank Order	Card Disliked
1	10	1	4
2	5	2	1
3	9	2	10
3	1	4	3
5	8	4	7
6	3	6	6
7	7	7	2
8	2	7	8
9	6	9	5
9	4	10	9

TABLE 24

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR RAW SCORES, MENTAL AGE, QUOTIENT SCORES, TOTAL WEIGHTED SCORES, AND INTELLIGENCE QUOTIENT OF FACTORS FOR ACHIEVERS AND NON-ACHIEVERS ON THE SRA PRIMARY MENTAL ABILITIES FOR AGES 5 TO 7

Factor		Achievers (N = 7)		Non-Achievers (N = 9)		D	t	F
		$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Raw Score	V	41.43	4.29	38.67	31.75	2.76	1.23	7.41*
	S	12.86	18.48	11.67	32.25	1.19	.46	1.75
	P	21.00	22.67	18.33	44.25	2.67	.89	1.95
	Q	17.29	22.57	14.56	51.03	2.73	.87	2.26
	MO	41.29	73.90	33.11	212.61	8.17	1.31	2.88
Total mental age		79.14	45.14	76.44	91.78	2.70	.63	2.03
Mental Age Score	V	82.00	21.33	78.89	83.11	3.11	.82	3.90
	S	66.86	91.81	64.22	198.44	2.63	.42	2.16
	P	83.71	147.24	79.11	159.11	4.60	.74	1.08
	Q	78.86	81.14	72.44	248.78	6.41	.96	3.07
	MO	94.00	117.33	85.33	289.00	8.66	1.17	2.46
Quotient Score	V	91.29	28.57	87.00	103.75	4.29	1.01	3.63
	S	74.14	116.14	71.44	244.78	2.70	.39	2.11
	P	93.14	179.14	88.00	199.75	5.14	.74	1.12
	Q	87.71	104.24	80.56	314.03	7.16	.95	3.01
	MO	104.43	145.62	93.56	338.28	10.87	1.35	2.32
Total weighted score		516.00	1,931.67	487.00	3786.75	29.00	1.05	1.96
Intelligence quotient		87.86	55.14	84.89	116.36	2.97	.62	2.11

	Actual df	Table df	.01**	.05*
t	14	14	2.98	2.15
F	8/6	8/6	10.60	5.60

performance between the achievers and non-achievers on the SRA Primary Mental Abilities, ages 5 to 7, suggests that at this age level the two populations may be similar and the test does not differentiate the groups. Small N's in this table make a generalization dangerous. With small N's, differences between the means may have to be larger than that which would indicate significant differences for larger N's with greater degrees of freedom. Nevertheless, none of the t values approaches significance. On the face value the conclusion for this sample may be justifiable. The employment of non-parametric statistics might be warranted in evaluating the performance of these groups.

Table 25 presents the means, variances, difference between means, t and F values for raw scores, mental age, quotient scores, total weighted scores and intelligence quotient of factors for achievers and non-achievers on the SRA Primary Mental Abilities. This table presents an entirely different picture from that in Table 24. Fifteen t and F values were significant at either the .05 or .01 level. The values for the verbal raw score, verbal mental age score, and verbal quotient score reveal significant F's beyond the .01 level, indicating greater variance among the non-achievers. The t values for the same factor were significant at less than the .05 level. The t and F values for the Vw (part score) on raw scores, mental age, and quotient revealed significant differences between the means beyond the .01 level of confidence. An examination of the table also shows that the t and F values for Vp (part score) on raw scores, mental age, and quotient were not significant and reflected no differences when the subjects' verbal ability was tested using pictures. (The examiner read a vocabulary word, and the subjects marked one of a series of pictures which best defined the word read aloud.) The t and F values for the reading aptitude quotient and CERA (current estimated reading age) also exhibit significant differences between means below the .01 level. The achievers performed significantly better than the non-achievers on arithmetic quotient and current estimated arithmetic age.

The table also strongly reflects performances requiring minimal verbal behavior as not differentiating the groups. When the verbal problem-solving and generalization behavior as opposed to concrete-pictorial tasks were required, the SRA Primary Mental Abilities, ages 7 to 11, differentiated the group. Whether these differences found are indicative of Primary Mental Abilities or whether they tap the same or equivalent resources as the verbal subtests of the Metropolitan Achievement Test, introduces speculation and requires serious exploration.

TABLE 25

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, $\underline{t}$ AND F VALUES FOR RAW SCORES, MENTAL AGE AND QUOTIENT SCORES OF FACTORS AND PART SCORES, INTELLIGENCE QUOTIENT AND CURRENT ESTIMATED ARITHMETIC AND READING AGES FOR ACHIEVERS AND NON-ACHIEVERS ON THE SRA PRIMARY MENTAL ABILITIES FOR AGES 7 TO 12

Category			Achievers (N = 43)		Non-Achievers (N = 40)		D	$\underline{t}$	F
			$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Raw Score	Factor	V	31.56	172.06	25.93	53.51	5.63	2.39*	3.22**
		S	11.65	20.80	12.20	25.55	- .55	.52	1.23
		R	26.70	85.88	21.75	50.04	4.95	2.72**	1.72
		P	18.79	126.22	17.95	78.82	.84	.38	1.60
		N	25.81	226.01	23.08	180.53	2.74	.87	1.25
	Part Score	Vw	13.23	74.71	9.10	16.61	4.13	2.35*	4.50**
		Vp	18.33	31.99	16.98	31.10	1.35	1.09	1.03
		Rw	11.26	30.77	7.95	15.18	3.31	3.12**	2.03*
		RF	15.40	28.72	14.13	18.11	1.27	1.19	1.59
Mental Age	Factor	V	116.02	314.31	109.33	75.87	6.70	2.16*	4.14**
		S	98.33	414.08	100.05	542.25	-1.72	.36	1.31
		R	103.58	346.20	93.40	186.09	10.18	2.82**	1.86
		P	112.93	1010.54	110.35	622.13	2.58	.41	1.62
		N	116.88	657.96	111.70	402.16	5.18	1.02	1.64
	Part Score	Vw	114.19	300.73	105.70	61.45	8.49	2.84**	4.89**
		Vp	120.51	393.54	118.05	425.33	2.46	.55	1.08
		Rw	102.19	269.87	92.75	126.09	9.44	3.03**	2.14*
		RF	107.54	899.78	101.55	402.56	5.99	1.06	2.24**

TABLE 25--Continued

Category			Achievers (N = 43)		Non-Achievers (N = 40)		D	t	F
			$\overline{X}$	σ^2	$\overline{X}$	σ^2			
Quotient	Factor	V	84.67	155.42	79.45	41.18	5.22	2.37^{*}	3.77^{**}
		S	71.65	213.42	72.50	266.77	- .85	.25	1.25
		R	75.26	169.05	68.70	86.83	6.56	2.62^{*}	1.95
		P	82.30	521.03	80.43	315.28	1.88	.42	1.65
		N	85.28	341.78	81.10	199.68	4.18	1.15	1.71
	Part Score	Vw	83.16	149.04	76.88	36.37	6.29	2.94^{**}	4.10^{**}
		Vp	87.79	202.41	84.65	182.08	3.14	1.03	1.11
		Rw	74.54	131.11	67.48	64.51	7.06	3.23^{**}	2.03^{*}
		RF	79.70	327.41	73.48	199.38	6.22	1.74	1.64
Intelligence Quotient	Estimate for reader		80.47	123.45	76.90	40.45	3.57	1.78	3.05^{**}
	Estimate for non-reader		83.74	166.72	80.43	107.64	3.32	1.29	1.55
Aptitude	Reading	Quotient	83.16	149.04	76.88	36.37	6.29	2.94^{**}	4.10^{**}
		Current estimated reading age	144.19	300.73	105.70	61.45	8.49	2.84^{**}	4.89^{**}
	Arithmetic	Quotient	82.19	161.54	76.58	78.20	5.61	2.32^{*}	2.07^{*}
		Current estimated arithmetic age	113.26	354.24	104.45	158.15	8.81	2.49^{*}	2.24^{**}

	Actual df	Table df	$.01^{**}$	$.05^{*}$
t	81	80	2.64	1.99
F	42/39	40/38	2.19	1.98

[Extrapolated and Interpolated]

Audiology and Speech Pathology

This portion of the investigation was designed to determine whether or not differences exist between achievers and non-achievers in auditory and visual skills, structure and muscular control of the oral-peripheral speech mechanism, articulatory proficiency, and complexity of grammatical structure.

Auditory Skills

It was postulated earlier that no differences would appear on auditory skill performances between achievers and non-achievers. Table 26 shows the means, variances, difference between means, t and F values for achievers and non-achievers in auditory recognition,

TABLE 26

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES OF AUDITORY SKILLS FOR ACHIEVERS AND NON-ACHIEVERS

		Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	t	F
			$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Auditory Skill	Recognition	"ball" etc.	12.00		12.00				
		"boy" etc.	12.00		12.00				
	Memory Span	Largest number words repeated correctly disregarding previous errors	10.14	7.63	9.84	6.30	.30	.57	1.21
		Largest number words correct in consecutive order	9.42	10.82	9.40	10.00	.02	.03	1.08
Number Correct		Following directions	9.60	.74	9.42	1.07	.18	.95	1.45
		Following a paragraph	1.12	1.25	1.34	1.54	-.22	.93	1.23
		Following a story	7.00	8.86	7.28	14.86	-.28	.41	1.68*

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	98	2.63		1.98	
F	49/49	50/50		1.94		1.60

the two ways of evaluating auditory memory span (total number of words repeated correctly regardless of intervening errors, and total number of words repeated correctly in consecutive order), number correct in following directions, following a paragraph, and following a story. Table 27 shows the most frequent errors made by both groups in the auditory memory span task. In the sentence,

TABLE 27

NUMBER OF ACHIEVERS AND NON-ACHIEVERS MAKING SPECIFIC ERRORS IN AUDITORY MEMORY SPAN TASKS

Sentence	Error	Achievers (N = 50)	Non-Achievers (N = 50)
"Father took me to the movies while mother was having her hair done."	"had" for "was having"	8	6
	"while mother was having her hair done" omitted	2	7
	"my" inserted before "mother"	1	7
"Where are your mother and father going today?"	"is" for "are"	6	8
	"father and mother" for "mother and father"	2	3

χ^2	df	$P_{.01}$**	$P_{.05}$*
8.04	4	13.28	9.49

"Father took me to the movies while mother was having her hair done," 8 achievers and 6 non-achievers substituted "had" for "was having," 2 achievers and 7 non-achievers omitted the final clause, 1 achiever and 7 non-achievers inserted "my" before "mother." In the sentence, "Where are your mother and father going today?" 6 achievers and 8 non-achievers substituted "is" for "are," and 2 achievers and 3 non-achievers substituted "father and mother" for "mother and father." The chi square value of 8.04 was not significant. Observation of the distribution of the performance on items 2 and 3 reveals many more errors for the non-achievers. Table 28 shows the number of achievers and non-achievers who followed directions correctly. A

TABLE 28

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO DID PARTICULAR TEST ITEMS CORRECTLY IN FOLLOWING DIRECTIONS

Task	Achievers (N = 50)	Non-Achievers (N = 50)
1. Ring the bell.	50	50
2. Catch the ball.	50	48
3. Put the ball into the cup.	49	50
4. Put the horse into the box.	50	50
5. Bounce the ball three times.	42	46
6. Move the Indian next to the cowboy.	35	41
7. Pick up the telephone and say "Hello!"	47	50
8. Put the spoon between the cup and the ball.	47	46
9. Place the car on the table and push it to me.	50	50
10. Pick up the crayon, draw a line on the paper, and put the crayon back in the box.	50	50

χ^2	df	$P_{.01}$ **	$P_{.05}$ *
0.70	9	21.67	16.92

chi square value of 0.70 reveals no significant difference in following directions. Table 29 gives the number of achievers and non-achievers who made correct responses to questions following a paragraph. The chi square value of 0.03 signifies no difference in performance on this task.

TABLE 29

NUMBER OF ACHIEVERS AND NON-ACHIEVERS ANSWERING PARTICULAR QUESTIONS CORRECTLY IN FOLLOWING A PARAGRAPH

Question	Achievers (N = 50)	Non-Achievers (N = 50)
1. What did Mary do all morning?	28	22
2. When was she too tired to eat?	20	19
3. Who found Mary asleep?	18	17

χ^2	df	$P_{.01}$**	$P_{.05}$*
0.03	1	6.64	3.84

Analysis of auditory skills as tested by these items suggests that auditory abilities are learned by children who reach the mental ages of 3 and 4. This supports the hypothesis advanced by Carhart (22) that auditory decoding skills are learned early.

Visual Skills

Table 30 presents means, variances, difference between means, t and F values for visual skills (time in seconds) for achievers and non-achievers in matching picture with picture, letter with letter, number with number, word with picture, sentence with sentence, and a word with a word in a sentence. Examination of the table reveals that most of the differences between the means were small. Ten F values were significant at less than the .02 level, indicating a greater variability among the non-achievers, while only one t value on matching a word with a word in a sentence was significant at the .05 level. This may not constitute a true difference because the non-achievers also showed a significant variance. It is noteworthy that this task, being the more complex, demonstrated the significant difference (.05 level) between groups. Table 31 shows that 10 of the non-achievers were non-readers, which is reflected in the inability of the non-achievers to respond to the tasks of matching word with picture, sentence with sentence, and word with a word in a sentence. In all 10 there were many trial-and-error attempts to complete the tasks.

TABLE 30

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES ON VISUAL SKILLS (TIME IN SECONDS) FOR ACHIEVERS AND NON-ACHIEVERS

Visual Skill			Achievers			Non-Achievers			D	t	F
			N	$\overline{X}$	σ^2	N	$\overline{X}$	σ^2			
Matching	Picture With Picture	ball etc.	50	12.39	22.74	50	12.32	50.27	.07	.06	2.21**
		boy etc.	50	11.04	23.35	50	10.15	31.93	- .89	.84	1.37
	Letter With Letter	W etc.	50	9.68	14.62	50	10.21	91.19	- .52	.36	6.24**
		F etc.	50	8.96	16.95	50	9.74	39.84	- .78	.74	2.35**
		H etc.	50	8.22	8.79	50	8.94	29.41	- .72	.83	3.35**
		t etc.	50	14.25	60.00	50	14.45	99.60	- .20	.11	1.66**
		n etc.	50	9.88	21.11	50	10.81	52.70	- .93	.76	2.50**
	Number With Number	8 etc.	50	9.26	20.31	50	9.84	24.93	- .58	.61	1.23
		9 etc.	50	8.67	17.19	50	10.46	53.66	-1.80	1.51	3.12**
	Word With Picture	ball[a] etc.	50	11.10	46.00	40	12.91	69.28	-1.81	1.14	1.51
		boy[b] etc.	50	11.08	33.53	41	14.04	327.19	-2.96	1.09	9.76**

TABLE 30--Continued

Visual Skill			Achievers			Non-Achievers			D	t	F
			N	$\overline{X}$	σ^2	N	$\overline{X}$	σ^2			
Matching	Sentence With Sentence	Task 1[c]	50	23.07	113.21	49	27.05	378.99	-3.97	1.26	3.35**
		Task 2[d]	50	22.68	123.43	48	24.83	166.54	-2.16	.89	1.35
	A word with a word in a sentence[e]		50	11.55	25.75	38	14.69	95.75	-3.14	2.00*	3.72**

t				F					
Actual df	Table df	** .01	* .05	Actual df	Table df	** .01 [Interpolated]	* .05	** .02	* .10
98	98	2.63	1.98	49/49	50/50			1.94	1.60
[a]89	89	2.62	1.99	49/39	50/40	2.05	1.66		
[b]90	90	2.62	1.99	49/40	50/41	2.05	1.66		
[c]98	98	2.62	1.99	49/48	50/49	1.96	1.61		
[d]98	98	2.62	1.99	49/47	50/48	1.96	1.61		
[e]97	97	2.62	1.99	49/37	50/38	2.08	1.67		

TABLE 31

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO READ WORDS IN MATCHING WORD WITH PICTURE

Error	Achievers (N = 50)	Non-Achievers (N = 50)
Achievers and non-achievers who read words in matching word with picture	50	40

χ^2	df	$P_{.01}$**	$P_{.05}$*
1.01	1	6.64	3.84

Table 32 presents the number of achievers and non-achievers who made particular errors in matching letters ("t" series). An inspection of the table shows non-achievers made errors not made by

TABLE 32

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO MADE PARTICULAR ERRORS IN MATCHING LETTERS (t SERIES)

Error	Achievers (N = 50)	Non-Achievers (N = 50)
d for b b for d	1	2
b for d d for b p for q q for p	1	0
q for b b for d d for q	1	0
p for q q for p	1	2
t for f f for t	0	3
d for f f for d	0	1
p for b b for p	0	2
p for d d for b b for p	0	1
t for d p for q d for b q for p b for d	0	1

χ^2	df	$P_{.01}$**	$P_{.05}$*
10.64	8	20.09	15.51

achievers, but the chi square between the groups was not significant. Table 33 exhibits no differences between achievers and non-achievers in matching letters of the "F" series; confusions of "n," "h," and "u;" number of achievers and non-achievers making reversals; number of achievers and non-achievers not making errors in matching word with picture; word with a word in a sentence; and sentence errors.

TABLE 33

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO DID NOT MAKE PARTICULAR ERRORS IN: MATCHING LETTERS, LETTER CONFUSIONS, LETTER REVERSALS, WORD CONFUSIONS, MATCHING WORD WITH WORD IN SENTENCE, AND SENTENCE ERRORS

Error		Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Matching Letters	F for E, E for F, F for K, K for F, R for P, P for R, C for D, D for C	50	49	0.01
Confuse n, h, and u		44	46	0.04
Reversals		46	38	0.76
Matching Word With Picture	ball etc.	48	44	0.17
	boy etc.	45	48	0.10
Matching word with word in sentence		50	47	0.09
Sentence Errors	Task 1	48	45	0.10
	Task 2	45	40	0.29

df	$P_{.01}$**	$P_{.05}$*
1	6.64	3.84

Oral and Peripheral Examination

Table 34 gives means, variances, differences between means, t and F values for achievers and non-achievers in the oral-peripheral examination. Neither the oral-peripheral structure nor function differentiated achievers from non-achievers.

TABLE 34

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS IN THE ORAL-PERIPHERAL EXAMINATION

Oral-Peripheral Examination		Achievers (N = 50)		Non-Achievers (N = 50)		D	t	F
		$\overline{X}$	σ^2	$\overline{X}$	σ^2			
Oral-peripheral scale value		2.62	1.51	2.84	1.44	-.22	.91	1.04
Number Times Said In 5 Seconds	"pah"	26.60	17.18	26.24	14.27	.36	.45	1.20
	"tah"	27.02	14.80	26.98	35.73	.04	.04	2.42**
	"kah"	25.12	22.39	24.90	34.62	.22	.21	1.55

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	98	2.63		1.98	
F	49/49	50/50		1.94		1.60

Muscular Control for Speech

Table 35 also indicates that there were no significant differences between achievers and non-achievers in the number in each group who did particular items correctly. Achievers and non-achievers were not differentiated by tasks for muscular control of the articulators.

TABLE 35

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO DID ITEMS CORRECTLY IN MUSCULAR CONTROL FOR SPEECH

Task	Achievers (N = 50)	Non-Achievers (N = 50)
1	50	50
2	48	50
3	42	47
4	38	41
5	34	37
6	45	43
7	45	48
8	50	49
9	48	48

χ^2	df	$P_{.01}$**	$P_{.05}$*
0.51	8	20.09	15.51

Sensorimotor Involvement

When the achievers and non-achievers were examined for articulation involving sensorimotor function, no differences were noted. Table 36 indicates a chi square of 0.76 which is non-signigicant. Furthermore, inspection of the table indicates little

TABLE 36

NUMBER OF ACHIEVERS AND NON-ACHIEVERS WHO DID SENSORIMOTOR INVOLVEMENT ARTICULATION CORRECTLY

Involvement	Achievers (N = 50)	Non-Achievers (N = 50)
Lips	47	44
Tongue	35	42
Palate	48	48
Complex coordinations	35	39

χ^2	df	$P_{.01}$**	$P_{.05}$*
0.76	3	11.34	7.82

difference in terms of the number of subjects who completed the task without error.

Picture Articulation Test

Table 37 presents means, variances, differences between means, t and F values for achievers and non-achievers in correct number of articulations of consonants and blends. The correct production of consonants in the initial, medial, and final positions and blends did not differentiate between the achievers and non-achievers.

TABLE 37

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS IN CORRECT NUMBER OF ARTICULATIONS OF CONSONANTS AND BLENDS

Articulation		Achievers (N = 50)		Non-Achievers (N = 50)		D	t	F
		$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Consonants	Initial	21.24	2.02	21.26	3.22	-.02	.06	1.59
	Medial	22.46	3.52	22.66	4.11	-.20	.51	1.17
	Final	18.64	3.09	18.74	4.16	-.10	.26	1.34
Blends		20.16	14.75	21.04	5.18	-.88	1.39	2.85^{**}

	Actual df	Table df	$.01^{**}$	$.02^{**}$	$.05^{*}$	$.10^{*}$
t	98	98	2.63		1.98	
F	49/49	50/50		1.94		1.60

Table 38 shows correlation of correct articulations with chronological age for initial, medial, and final consonant positions and blend. The table indicates an r of .33 was significant at the .05 level of confidence for the achievers in the medial consonant position. Nevertheless, even with this significant r, the percentage of predictable variance was low. For the non-achievers, no r was significant. These r values permitted the hypothesis that the skills involved in articulation may be acquired at chronological age levels below those of the subjects in this study.

When the articulatory errors were analyzed, significant differences did appear between the achievers and non-achievers with respect to position and category of errors. Table 39 presents a

TABLE 38

CORRELATIONS OF CORRECT ARTICULATIONS WITH CHRONOLOGICAL AGE FOR INITIAL, MEDIAL, AND FINAL CONSONANT POSITIONS AND BLENDS

Articulation		Achievers (N = 50)		Non-Achievers (N = 50)	
		r	r^2	r	r^2
Consonants	Initial	.24	.06	.21	.04
	Medial	.33*	.11	.14	.02
	Final	.20	.04	.25	.06
Blends		.20	.04	.23	.05

df	$r_{.01}$**	$r_{.05}$*
48	.36	.28

[Interpolated]

TABLE 39

OMISSIONS, SUBSTITUTIONS, AND DISTORTIONS IN THE INITIAL, MEDIAL, AND FINAL POSITIONS ON THE ARTICULATION TEST FOR ACHIEVERS AND NON-ACHIEVERS

Position	Category	Achievers (N = 50)	Non-Achievers (N = 50)	Category		Position	
				χ^2	df	χ^2	df
Initial	Omission	2	2		1		2
	Substitution	57	69		1	3.78	2
	Distortion	28	17		1		2
Medial	Omission	3	13	6.25*	1		2
	Substitution	77	77		2	11.16**	2
	Distortion	44	25	5.23*	1		2
Final	Omission	12	24	4.00*	1		2
	Substitution	59	70	6.52*	1	11.68**	2
	Distortion	47	25	6.72**	1		2

df	$P_{.01}$**	$P_{.05}$*
1	6.64	3.84
2	9.21	5.99

chi square analysis beteen number of achievers and non-achievers making omissions, substitutions, and distortions in the initial, medial and final positions on the articulation test. Table 39 indicates that for the initital position the performance of the achievers and non-achievers did not differ, but examination of the table reveals that with regard to distortions, the non-achievers made almost three times as many errors in distortion as the achievers. Even though the chi square does not indicate significance, the number of errors might influence intelligibility. Chi squares significant at the .01 level for the medial and final positions show that non-achievers differed from the achievers. Except for the substitution category in the medial position, the five chi squares for categories were significant. Consonant errors in position and category did differentiate achievers and non-achievers. Table 40 shows that errors of omissions and distortions in the articulation of blends were significant at the .10 level. This task differentiated achievers and non-achievers and revealed more distortions of blends by achievers. Figure 7 presents these differences. It would appear that non-achievers in making more omissions and substitutions and fewer distortions perceived and produced the sounds of speech less accurately than achievers.

TABLE 40

OMISSIONS AND DISTORTIONS ON BLENDS IN THE ARTICULATION TEST FOR ACHIEVERS AND NON-ACHIEVERS

Category	Achievers (N = 50)	Non-Achievers (N = 50)	$\chi 2$ (df=1)	
Omission	0	2		12.52**
Distortion	87	46	12.64**	

$\chi 2$	df	$P_{.01**}$	$P_{.05*}$
12.52	1	6.64	3.84

Table 41 presents comparisons of the present investigation with the investigations by Strazzulla (94) and Batza (10) in order of frequency of difficulty with consonants. An examination of Table 41 reveals all groups had difficulty with the lingua-dental sounds, sibilants (r), and (l) sounds. Figure 8 illustrates the differences in rank order among achievers, non-achievers, Strazzulla's and Batza's subjects. It is possible the variation in results, particularly in the cases of (ʍ) and (ʒ), was due to the methodological difference of a picture test versus the imitative method. Table 42 discloses the similarity between the three studies in sounds on which no error was made and sounds most frequently distorted.

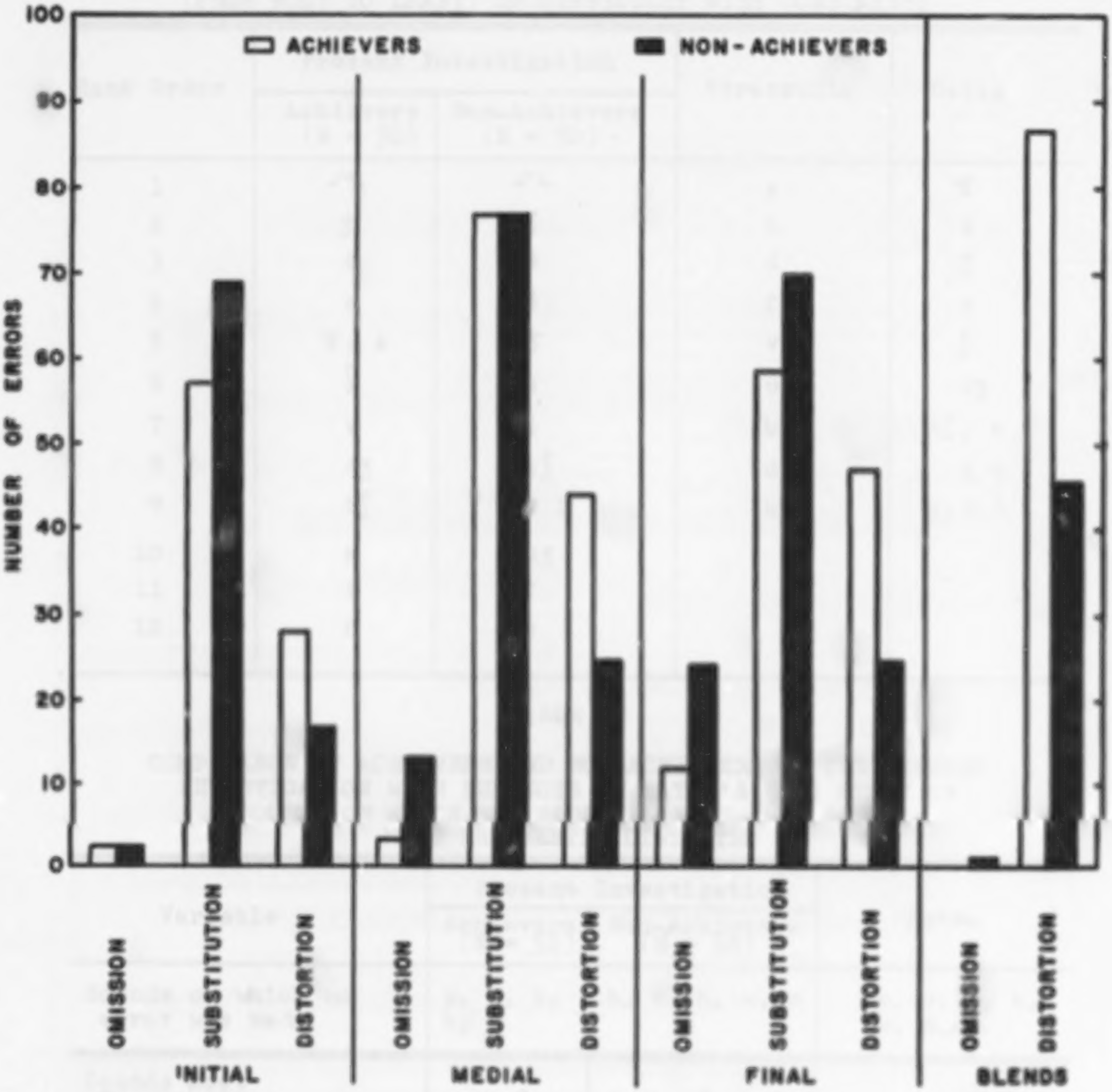

Fig. 7.—Omissions, substitutions, and distortions in the initial, medial, and final positions on the articulation test made by fifty achievers and fifty non-achievers.

TABLE 41

COMPARISONS OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH THE SUBJECTS IN INVESTIGATIONS BY STRAZZULLA (94) AND BATZA (10) ON ORDER OF FREQUENCY (FROM MOST TO LEAST) OF DIFFICULTY WITH CONSONANTS

Rank Order	Present Investigation		Strazzulla	Batza
	Achievers (N = 50)	Non-Achievers (N = 50)		
1	ʍ	ʍ	s	ð
2	ʒ	ʒ	t	θ
3	θ	θ	d	ʒ
4	z	v	f	r
5	ð, s	ð	v	ʃ
6	ʃ	s	θ	dʒ
7	v	z	b	tʃ, v
8	dʒ	tʃ	d	d, ŋ
9	tʃ	ʃ, l	k	g, f, l
10	r	dʒ		
11	l	f		
12	f	r		

TABLE 42

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH SUBJECTS IN BATZA'S (10) STUDY ON SOUNDS ON WHICH NO ERROR WAS MADE, AND SOUNDS MOST FREQUENTLY DISTORTED

Variable	Present Investigation		Batza
	Achievers (N = 50)	Non-Achievers (N = 50)	
Sounds on which no error was made	p, b, k, h, w	b, k, h, w, m	p, b, m, h, w, n, ʍ
Sounds most frequently distorted	s, z, ʃ	s, tʃ, ð	θ, tʃ, ʃ

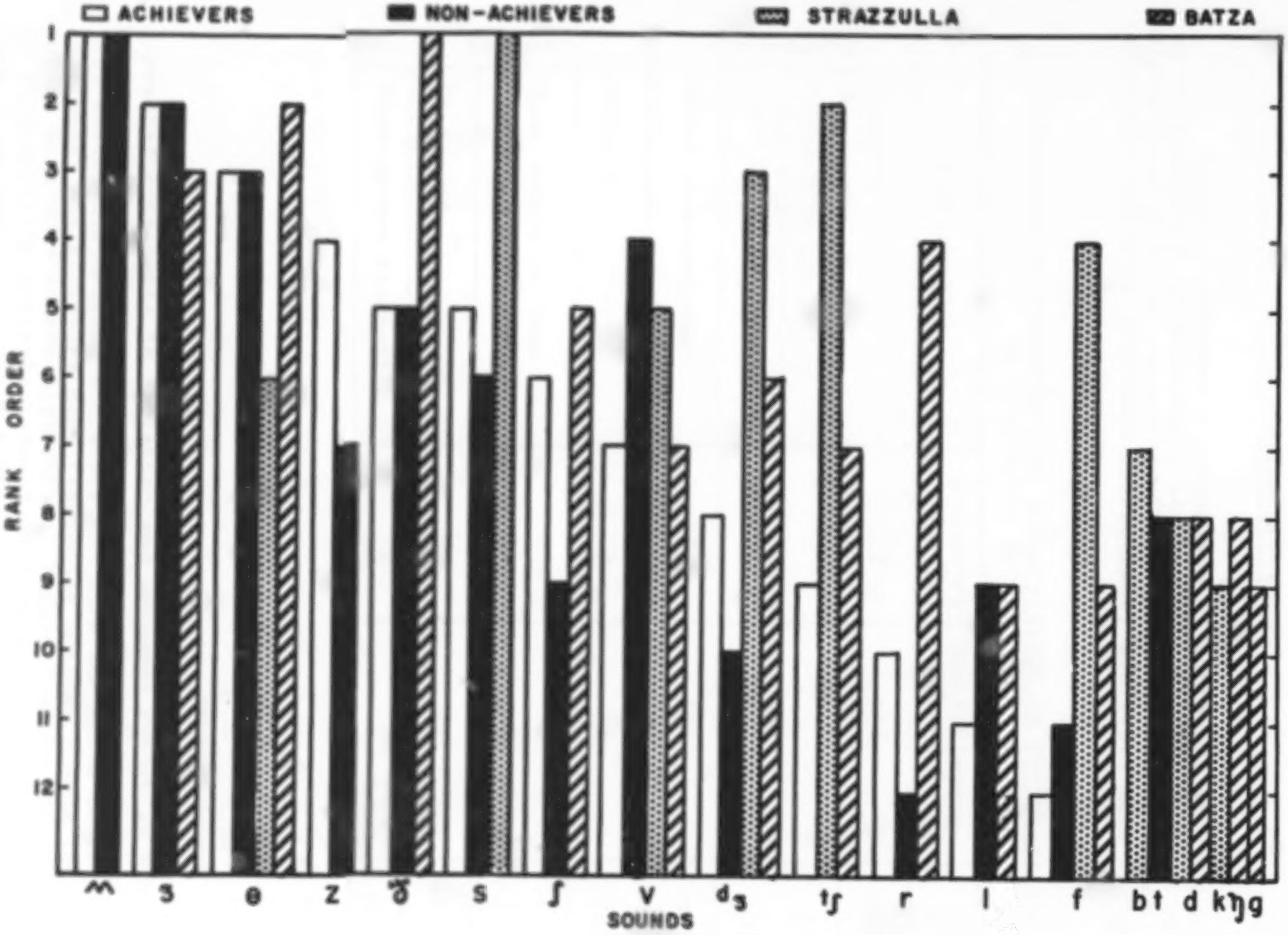

Fig. 8.--Comparisons of fifty achievers and fifty non-achievers in present investigation with the subjects in investigations by Strazzulla and Batza on order of frequency (from most to least) of difficulty with consonants.

Stimulability

Table 43 presents a comparison of achievers and non-achievers on stimulability of consonants and blends. All chi squares were significant with the exception of correction of blends. Non-achievers had more consonant corrections; achievers more frequently corrected consonants in isolation and nonsense syllables but not in words; achievers frequently changed blends from a more severe to a less severe distortion; achievers had more instances of no change in blends; and achievers more frequently changed blends from a less severe to a more severe distortion. Figure 9 shows the differences in stimulability criteria between achievers and non-achievers. From these results it would appear that the learning of speech sounds by achievers was relatively stable, while the speech sounds of non-achievers can be changed more readily.

TABLE 43

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON STIMULABILITY OF CONSONANTS AND BLENDS

	Stimulability	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Consonants	Correct	102	168	16.13**
	Correct on isolation and nonsense syllables, not on words	31	15	5.57*
	Sound remained same	160	106	10.96**
Blends	Correct	9	19	3.57
	More severe to less severe distortion	11	0	11.00**
	No change	59	27	11.90**
	More severe distortion	8	1	4.00*

df	$P_{.01}$**	$P_{.05}$*
1	6.64	3.84

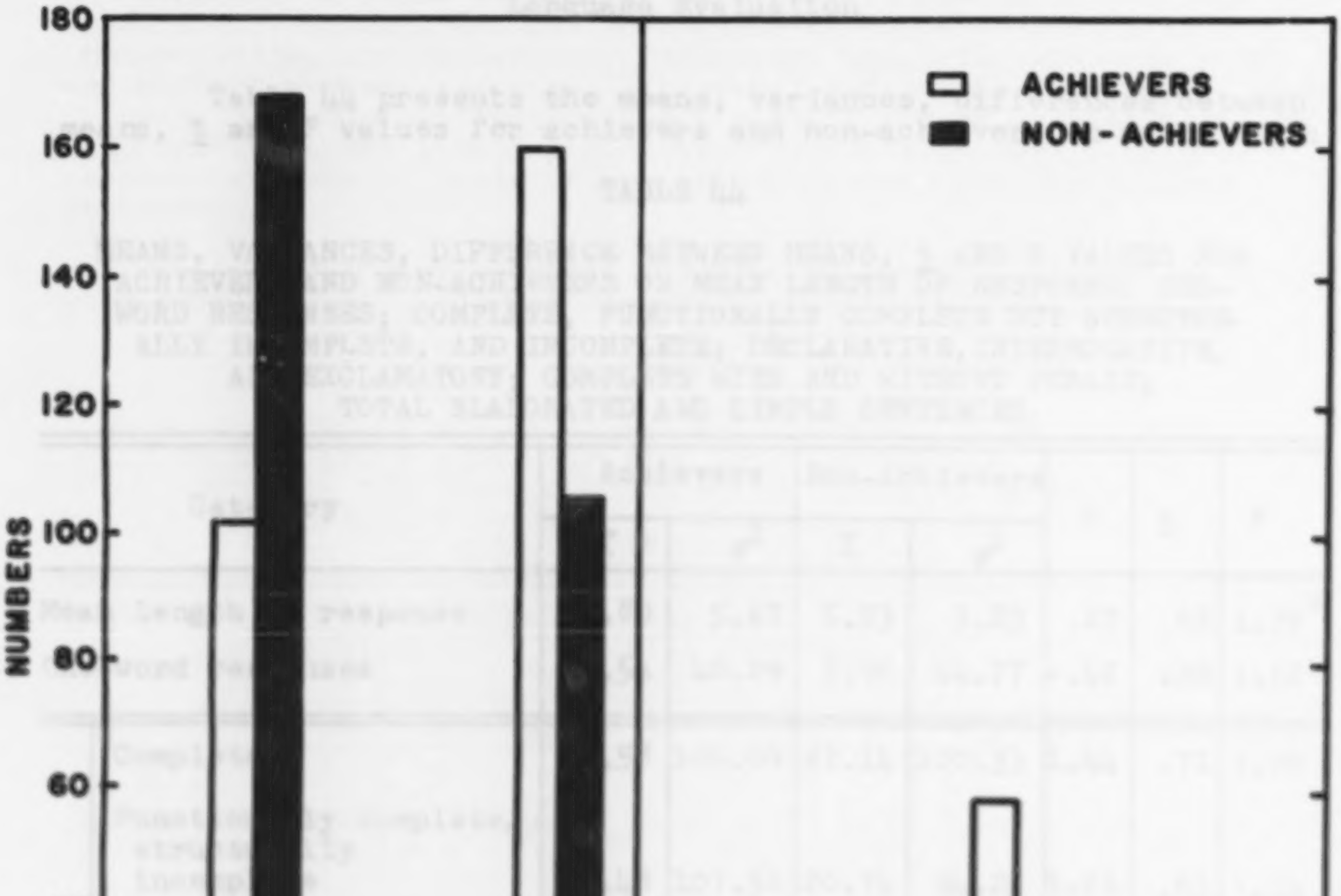

Fig. 9.—Comparison of fifty achievers and fifty non-achievers on stimulability of consonants and blends.

Language Evaluation

Table 44 presents the means, variances, differences between means, t and F values for achievers and non-achievers on mean length

TABLE 44

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS ON MEAN LENGTH OF RESPONSE: ONE-WORD RESPONSES; COMPLETE, FUNCTIONALLY COMPLETE BUT STRUCTURALLY INCOMPLETE, AND INCOMPLETE; DECLARATIVE, INTERROGATIVE, AND EXCLAMATORY; COMPLETE WITH AND WITHOUT PHRASE; TOTAL ELABORATED AND SIMPLE SENTENCES

	Category	Achievers		Non-Achievers		D	t	F
		$\bar{X}$	σ^2	$\bar{X}$	σ^2			
	Mean length of response	5.80	5.67	5.53	3.23	.27	.62	1.76*
	One-word responses	5.54	40.09	5.96	44.77	-.42	.32	1.12
Sentences	Complete	28.58	106.09	27.14	100.33	1.44	.71	1.06
	Functionally complete, structurally incomplete	19.48	107.56	20.74	94.24	1.26	.63	1.14
	Incomplete	2.08	5.42	2.20	6.16	.12	.25	1.14
	Declarative	48.16	16.91	48.84	4.95	.68	1.03	3.41**
	Interrogative	1.30	7.28	.80	3.31	-.50	1.09	2.28**
	Exclamatory	.48	4.87	.32	.92	-.16	.47	5.31**
	Complete with phrase	11.60	64.82	10.68	42.59	-.08	.63	1.52
	Complete without phrase	16.98	91.82	16.04	67.71	.94	.53	1.36
	Total elaborated	8.08	51.14	7.06	32.71	1.02	.79	1.56
	Simple	20.50	85.03	20.08	79.14	.42	.23	1.07

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	98	2.63		1.98	
F	49/49	50/50		1.94		1.60

of response; one-word responses; complete, functionally complete but structurally incomplete, and incomplete sentences; declarative, interrogative, and exclamatory sentences; complete sentences with and without phrase; and total elaborated and simple sentences. None of these variables differentiated achievers and non-achievers, although achievers showed significant variance in mean length of response and use of declarative, interrogative, and exclamatory sentences.

Table 45 compares the subjects of the present investigation with Templin's (95) and Batza's (10) subjects on mean length of response; and it compares the subjects of the present investigation with Templin's (95) subjects on one-word responses and percentage of total elaborated sentences. Figure 10 shows differences between achievers and non-achievers in mean length of response as compared with Templin's normal subjects. An examination of Table 45 reveals that the length of response of achievers was comparable to slight more than Templin's normal 5-year-old subjects; the non-achievers, to between 4 1/2- and 5-year-old subjects. The mean length of response of the subjects in this investigation was shorter than for those of

TABLE 45

COMPARISONS OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH TEMPLIN'S (95) AND BATZA'S (10) SUBJECTS ON MEAN LENGTH OF RESPONSE; AND WITH TEMPLIN'S (95) SUBJECTS ON ONE-WORD RESPONSES AND PERCENTAGE OF TOTAL ELABORATED SENTENCES

Category	Present Investigation				Templin		Batza			
	Achievers (N = 50)		Non-Achievers (N = 50)				I.Q. 70-85		I.Q. 60-69	
	C.A.	X̄	C.A.	X̄	C.A.	X̄	C.A.	X̄	C.A.	X̄
Length of response	13.28	5.80	13.16	5.53	3.5 4.0 4.5 5.0 6.0	4.7 5.4 5.4 5.7 6.6	14.18	7.62	14.15	7.35
Number of one-word responses	13.28	5.54	13.16	5.96	3.0 3.5	6.09 3.95				
Percent of total elaborated sentences	13.28	39.41	13.16	34.16	8.0	28.2				

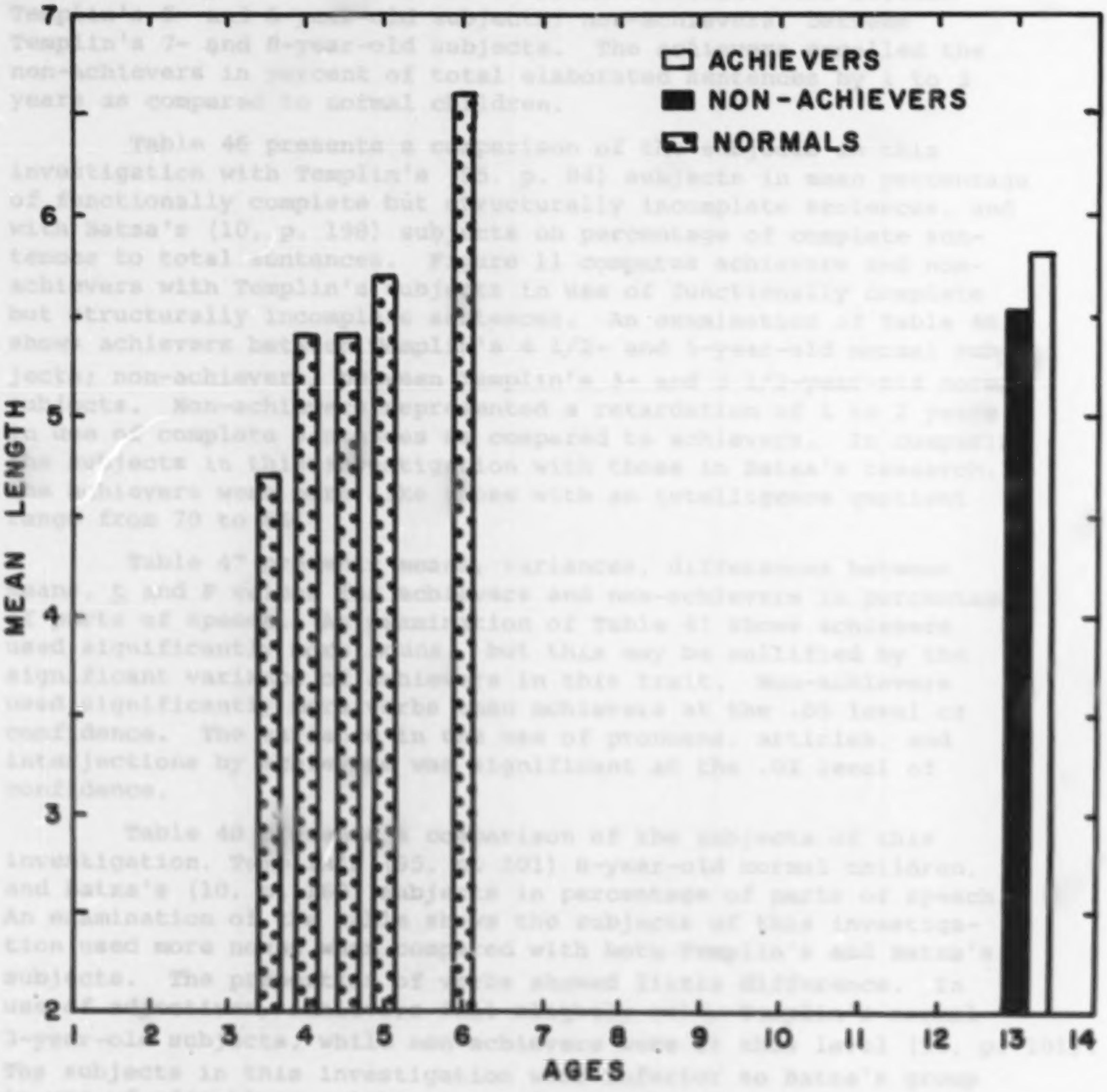

Fig. 10.--Comparisons of fifty achievers and fifty non-achievers in the present investigation with Templin's subjects on mean length of response.

Batza's subjects. This may be a function of the difference between use of stimulus pictures and direct questioning in eliciting responses. In number of one-word responses, the achievers and non-achievers were between Templin's 3- and 3 1/2 year old subjects. Achievers in percent of total elaborated sentences were between Templin's 5- and 6-year-old subjects; non-achievers, between Templin's 7- and 8-year-old subjects. The achievers excelled the non-achievers in percent of total elaborated sentences by 1 to 3 years as compared to normal children.

Table 46 presents a comparison of the subjects in this investigation with Templin's (95, p. 84) subjects in mean percentage of functionally complete but structurally incomplete sentences, and with Batza's (10, p. 198) subjects on percentage of complete sentences to total sentences. Figure 11 compares achievers and non-achievers with Templin's subjects in use of functionally complete but structurally incomplete sentences. An examination of Table 46 shows achievers between Templin's 4 1/2- and 5-year-old normal subjects; non-achievers, between Templin's 3- and 3 1/2-year-old normal subjects. Non-achievers represented a retardation of 1 to 2 years in use of complete sentences as compared to achievers. In comparing the subjects in this investigation with those in Batza's research, the achievers were more like those with an intelligence quotient range from 70 to 85.

Table 47 presents means, variances, differences between means, t and F values for achievers and non-achievers in percentage of parts of speech. An examination of Table 47 shows achievers used significantly more nouns, but this may be nullified by the significant variance of achievers in this trait. Non-achievers used significantly more verbs than achievers at the .05 level of confidence. The variance in the use of pronouns, articles, and interjections by achievers was significant at the .02 level of confidence.

Table 48 presents a comparison of the subjects of this investigation, Templin's (95, p. 101) 8-year-old normal children, and Batza's (10, p. 160) subjects in percentage of parts of speech. An examination of the table shows the subjects of this investigation used more nouns when compared with both Templin's and Batza's subjects. The proportion of verbs showed little difference. In use of adjectives, achievers fell slightly below Templin's normal 3-year-old subjects, while non-achievers were at this level (95, p. 101). The subjects in this investigation were inferior to Batza's group in use of adjectives. Achievers and non-achievers used fewer adverbs than did Templin's 3-year-old subjects (95, p. 101). Batza's subjects with intelligence quotients from 60 to 69 used fewer adverbs than either the achievers or non-achievers. The use of pronouns by achievers was comparable to Templin's subjects; non-achievers, to Batza's subjects. Both achievers and non-achievers used more conjunctions than Templin's subjects; non-achievers differed more from Batza's subjects than did the achievers. In the use of prepositions, achievers were comparable to Templin's 8-year-old subjects; non-achievers, between the 6- and 8-year-old levels (95, p. 101). The use of articles showed few differences.

TABLE 46

COMPARISONS OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH TEMPLIN'S (95) SUBJECTS ON MEAN PERCENTAGE OF FUNCTIONALLY COMPLETE BUT STRUCTURALLY INCOMPLETE SENTENCES; AND WITH BATZA'S (10) SUBJECTS ON PERCENTAGE OF COMPLETE SENTENCES TO TOTAL SENTENCES

Category	Present Investigation				Templin		Batza			
	Achievers (N = 50)		Non-Achievers (N = 50				I.Q. 70-85		I.Q. 60-69	
	C.A.	$\bar{X}$	C.A.	$\bar{X}$	C.A.	$\bar{X}$	C.A.	$\bar{X}$	C.A.	$\bar{X}$
Percent of functionally complete but structurally incomplete sentences	13.28	18.68	13.16	27.28	3.0 3.5 4.0 4.5 5.0	28.2 23.8 19.7 19.5 17.2				
Percent of complete sentences to total sentences	13.28	57.36	13.16	54.28			14.18	60.00	14.15	50.00

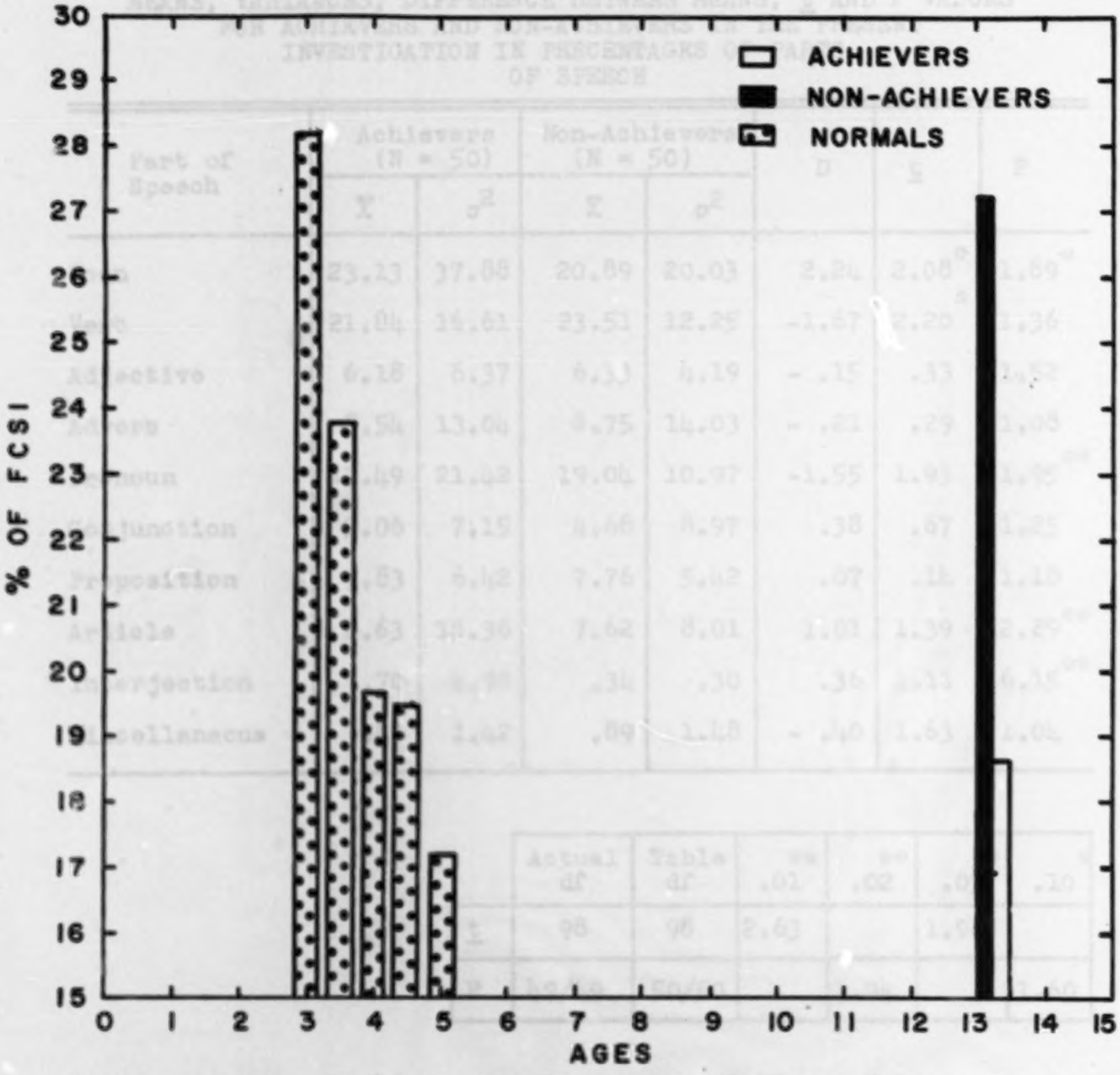

Fig. 11.--Comparisons of fifty achievers and fifty non-achievers in the present investigation with Templin's subjects on mean percentage of functionally complete but structurally incomplete sentences.

TABLE 47

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION IN PERCENTAGES OF PARTS OF SPEECH

Part of Speech	Achievers (N = 50)		Non-Achievers (N = 50)		D	*t*	F
	$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Noun	23.13	37.88	20.89	20.03	2.24	2.08#	1.89#
Verb	21.84	16.61	23.51	12.25	-1.67	2.20#	1.36
Adjective	6.18	6.37	6.33	4.19	- .15	.33	1.52
Adverb	8.54	13.04	8.75	14.03	- .21	.29	1.08
Pronoun	17.49	21.42	19.04	10.97	-1.55	1.93	1.95##
Conjunction	5.06	7.15	4.68	8.97	.38	.67	1.25
Preposition	7.83	6.42	7.76	5.42	.07	.14	1.18
Article	8.63	18.36	7.62	8.01	1.01	1.39	2.29##
Interjection	.70	4.90	.34	.30	.36	1.11	16.15##
Miscellaneous	.49	1.42	.89	1.48	- .40	1.63	1.04

	Actual df	Table df	## .01	## .02	# .05	# .10
t	98	98	2.63		1.98	
F	49/49	50/50		1.94		1.60

Achievers and non-achievers were more comparable to Batza's group in use of interjections than to Templin's younger subjects. The decrease in miscellaneous words with increasing chronological age observed by Templin (95,p. 101) probably accounted for the variation between the subjects of the present investigation and Templin's group. Non-achievers used slightly more miscellaneous words.

TABLE 48

COMPARISONS OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH TEMPLIN'S (95) EIGHT-YEAR-OLD SUBJECTS AND WITH BATZA'S (10) SUBJECTS ON PERCENTAGES OF PARTS OF SPEECH

Part of Speech	Present Investigation		Templin	Batza	
	Achievers (N = 50)	Non-Achievers (N = 50)		I.Q. 70-85	I.Q. 60-69
	(C.A.=13.28)	(C.A.=13.16)		(C.A.=14.18)	(C.A.=14.15)
	Percent	Percent	Percent	Percent	Percent
Noun	23.13	20.89	17.0	16.41	18.34
Verb	21.84	23.51	24.3	22.78	22.00
Adjective	6.18[a]	6.33	7.4	8.30	7.39
Adverb	8.54[a]	8.75[a]	9.1	8.21	7.52
Pronoun	17.49	19.04	17.8	20.93	20.24
Conjunction	5.06	4.68	3.7	5.87	5.42
Preposition	7.83	7.76	7.9	8.97	10.01
Article	8.63	7.62	8.1	8.00	8.72
Interjection	.70	.34	1.2	.53	.36
Miscellaneous	.49	.89	2.9		

[a] Below the 3-year-old level of Templin's subjects.

Table 49 presents means, variances, differences between means, *t* and F values for achievers and non-achievers on colloquialisms-slang, word approximations, and omissions of parts of a sentence. An examination of Table 49 shows non-achievers used significantly more colloquialisms-slang and word approximations. Figure 12 presents these differences between achievers and non-achievers. Table 50 presents a chi square analysis of specific errors made by both groups. Thirteen chi squares differentiated achievers from non-achievers. In colloquialisms-slang, non-achievers used "got" incorrectly and used miscellaneous colloquialisms-slang expressions more often than achievers. The specific word approximations used significantly more often by non-achievers were: "cause" for "because," "gonna" for "going to," [n] for [ŋ], and "yeah" for "yes." Non-achievers employed double negative constructions significantly more often than achievers. Achievers used "so" as a conjunction incorrectly significantly more often than non-achievers, but non-achievers omitted conjunctions more often than did achievers at the .05 level of confidence. Achievers made these errors significantly more often than did non-achievers: run-on sentence, error in word order, and pronoun redundant after a noun.

TABLE 49

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS ON COLLOQUIALISMS-SLANG, WORD APPROXIMATIONS, AND OMISSIONS OF PARTS OF A SENTENCE

Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	*t*	F
	$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Colloquialisms-slang	11.04	101.30	21.72	146.61	-10.68	-4.80^{**}	1.45
Word approximations	2.94	9.89	5.54	16.50	- 2.60	-3.60^{**}	1.67
Omission of parts of a sentence[a]	1.21	1.79	.92	2.24	.29	.95	1.25

	Actual df	Table df	$.01^{**}$	$.02^{**}$	$.05^{*}$	$.10^{*}$
t	98	98	2.63		1.98	
	[a]87	87	2.63		1.99	
F	49/49	50/50		1.94		1.60
	[b]49/49	50/50	2.08		1.67	

[b][Interpolated]

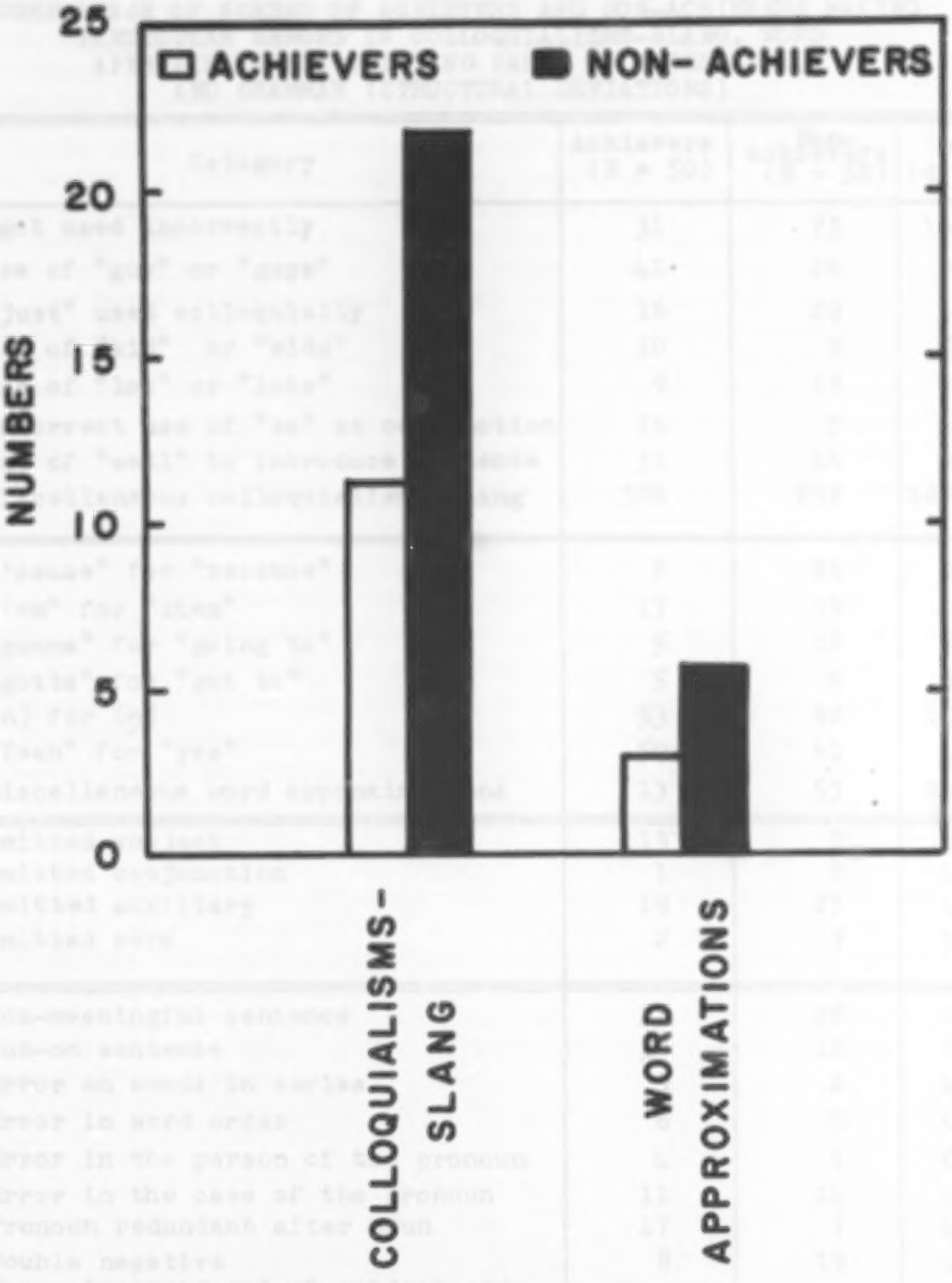

Fig. 12.—Means for fifty achievers and fifty non-achievers on colloquialisms-slang and word approximations.

TABLE 50

COMPARISON OF NUMBER OF ACHIEVERS AND NON-ACHIEVERS MAKING PARTICULAR ERRORS IN COLLOQUIALISMS-SLANG, WORD APPROXIMATIONS, OMITTING PARTS OF A SENTENCE, AND GRAMMAR (STRUCTURAL DEVIATIONS)

	Category	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2 (df=1)
Colloquialisms-Slang	"got used incorrectly	31	73	16.93**
	Use of "guy" or "guys"	41	26	3.36
	"just" used colloquially	16	29	3.76
	Use of "kid" or "kids"	10	9	0.05
	Use of "lot" or "lots"	9	18	3.00
	Incorrect use of "so" as conjunction	16	5	5.76*
	Use of "well" to introduce sentence	31	46	2.92
	Miscellaneous colloquialisms-slang	388	872	185.92**
Word Approximations	"'cause" for "because"	8	26	9.53**
	"'em" for "them"	17	19	0.11
	"gonna" for "going to"	5	18	7.35**
	"gotta" for "got to"	5	6	0.09
	[n] for [ŋ]	53	92	10.49**
	"Yeah" for "yes"	59	61	4.84*
	Miscellaneous word approximations	13	53	24.24**
Omissions	Omitted subject	13	7	1.80
	Omitted conjunction	1	8	4.00*
	Omitted auxiliary	19	27	1.39
	Omitted verb	2	7	1.78
Grammar (Structural Deviations)	Non-meaningful sentence	23	28	0.49
	Run-on sentence	38	16	8.96**
	Error on words in series	9	2	4.45*
	Error in word order	6	5	0.09
	Error in the person of the pronoun	4	1	0.80
	Error in the case of the pronoun	11	14	0.36
	Pronoun redundant after noun	17	7	4.17*
	Double negative	8	19	4.48*
	Error in agreement of subject and verb	34	31	0.14
	Error in tense of the verb	10	6	1.00

df	$P_{.01}$**	$P_{.05}$*
1	6.64	3.84

Table 51 presents comparisons of the present investigation with Templin's (95, p. 99) and Smith's (90, pp. 183-190) investigations. An examination of Table 51 reveals the relatively close correspondence between the errors made by achievers and non-achievers and the normal subjects in the Templin and Smith studies.

Table 52 presents correlations between mean length of response, number of one-word responses, complete sentences, and elaborated sentences of achievers with chronological age, mental age, and intelligence quotient. Seven correlations were significant at the .01 level of confidence: mean length of response with chronological age for achievers; mean length of response with mental age for both achievers and non-achievers; and total elaborated sentences with chronological age and mental age for achievers and non-achievers. Four correlations were significant at the .05 level of confidence: mean length of response with chronological age for non-achievers; mean length of response with intelligence quotient for achievers and non-achievers; and total elaborated sentences with intelligence quotient for achievers.

Table 53 gives the partial correlations of mean length of response and total elaborated sentences with chronological age, mental age, and intelligence quotient. An inspection of the table shows the high correlations between chronological age and mental age, and the low correlations between chronological age and intelligence quotient, particularly for non-achievers. The first partial correlation coefficients indicate relationships between the two language variables and chronological age when the effect of mental age was removed. The correlations were substantially reduced. The second partial correlation coefficients indicate relationships between the language variables and chronological age which remained when the effect of intelligence quotient was removed. The correlations remained substantially the same. The third partial r was the relationship which remained when the effects of both mental age and intelligence quotient were removed. Only the relationship for achievers between mean length of response and chronological age remained significant.

TABLE 51

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS IN THE PRESENT INVESTIGATION WITH TEMPLIN'S (95) AND SMITH'S (90) SUBJECTS ON GRAMMATICAL DEVIATIONS

Category	Total	Present Investigation		Templin
		Achievers (N = 50)	Non-Achievers (N = 50)	
Colloquialisms-slang excluding "got" for "have"	2,726	893	1,833	"got" for "have"
Total word approximations	415	140	275	Verb not in agreement with subject
"got" for "have"	104	31	73	Auxiliary omitted
Verb not in agreement with subject	65	34	31	Colloquialisms-slang
Run-on sentence	54	38	16	Beginning sentence with and
Non-meaningful sentence	51	23	28	Errors in conjugation
Auxiliary omitted	46	19	27	Errors in word order
Double negative	27	8	19	Errors in case of noun or pronoun
Errors in case of pronoun	25	11	14	Double negative
Pronoun redundant after noun	24	17	7	Errors in use of preposition
Omitted subject	20	13	7	Noun and pronoun: gender and number
Error in tense of verb	16	10	6	"can" for "may"
Error on words in series[a]	11	9	2	Comparison of adjectives and adverbs
Error in word order[a]	11	6	6	

TABLE 51--Continued

Category	Total	Present Investigation		Smith
		Achievers (N = 50)	Non-Achievers (N = 50)	
Colloquialisms-slang excluding "got" for "have"	2,726	893	1,833	Use of the auxiliary
Total word approximations	415	140	275	Omission of the article
"got" for "have"	104	31	73	Errors in agreement between subject and verb
Errors in agreement of subject and verb	65	34	31	Use of "got" for "have"
Run-on sentence	54	38	16	Use of "ain't" or "hain't"
Non-meaningful sentences	51	23	28	Errors in number of noun or pronoun
Auxiliary omitted	46	19	27	Errors in word order
Double negative	27	8	19	Errors in the gender of the pronoun
Error in case of pronoun	25	11	14	Double negative
Pronoun redundant after noun	24	17	7	Errors in use of the preposition
Omitted subject	20	13	7	Noun and pronoun: gender and number
Error in tense of verb	16	10	6	"can" for "may"
Error on words in series[b]	11	9	2	Comparison of adjectives and adverbs
Error in word order[b]	11	6	6	

[a] Same incidence.

[b] Same incidence.

TABLE 52

CORRELATIONS OF MEAN LENGTH OF RESPONSE, NUMBER OF ONE-WORD RESPONSES, COMPLETE SENTENCES, AND ELABORATED SENTENCES OF ACHIEVERS AND NON-ACHIEVERS WITH CHRONOLOGICAL AGE, MENTAL AGE, AND INTELLIGENCE QUOTIENT

	Group	Chronological Age		Mental Age		Intelligence Quotient	
		r	r^2	r	r^2	r	r^2
Mean Length of Response	Achievers (N = 50)	$.47^{**}$	.22	$.48^{**}$	.23	$.32^{*}$	.10
	Non-Achievers (N = 50)	$.34^{*}$	.12	$.43^{**}$	.18	$.30^{*}$	.09
One-Word Responses	Achievers (N = 50)	-.08	.01	-.01	.00	.02	.00
	Non-Achievers (N = 50)	-.17	.03	-.13	.02	-.06	.00
Complete Sentences	Achievers (N = 50)	-.02	.00	-.03	.00	.07	.00
	Non-Achievers (N = 50)	.21	.04	.09	.01	-.05	.00
Total Elaborated Sentences	Achievers (N = 50)	$.38^{**}$	.14	$.39^{**}$	.15	$.29^{*}$	.08
	Non-Achievers (N = 50)	$.39^{**}$	.15	$.41^{**}$	.16	.17	.03

df	$r_{.01}^{**}$	$r_{.05}^{*}$
48	.36	.29

[Interpolated]

TABLE 53

PARTIAL CORRELATIONS OF MEAN LENGTH OF RESPONSE AND TOTAL ELABORATED SENTENCES OF ACHIEVERS AND NON-ACHIEVERS WITH CHRONOLOGICAL AGE, MENTAL AGE, AND INTELLIGENCE QUOTIENT

	Group	Pearson r's					First Order Partial r's				Second Order Partial r's	
							M.A. Constant		I.Q. Constant		M.A. and I.Q. Constant	
		C.A.	M.A.	I.Q.	MLR.	TES	MLR	TES	MLR	TES	MLR	TES
Chronological Age	Achievers (N = 50)	1	.89**	.24	.47**	.38**	.12	.07	.43**	.33*	.30*	.25
	Non-Achievers (N = 50)	1	.82**	.01	.34*	.39**	-.02	.11	.36*	.39**	.15	.12
Mental Age	Achievers (N = 50)		1	.61**	.48**	.39**						
	Non-Achievers (N = 50)		1	.53**	.43**	.41**						
Intelligence Quotient	Achievers (N = 50)			1	.32*	.29*						
	Non-Achievers (N = 50)			1	.30*	.17						

MLR = Mean Length of Response
TES = Total Elaborated Sentences

df	$r_{.01}$**	$r_{.05}$*
48	.36	.28

Social Casework

Table 54 presents means, variances, difference between means, t and F values for age of mothers and fathers, and scaled values for education of mothers and fathers of the fifty achieving and fifty non-achieving mentally retarded subjects. The D, t, and F values

TABLE 54

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR AGE OF MOTHERS AND FATHERS AND SCALED VALUES[a] FOR EDUCATION OF MOTHERS AND FATHERS OF ACHIEVERS AND NON-ACHIEVERS

Category		Achievers			Non-Achievers			D	t	F
		N	$\bar{X}$	σ^2	N	$\bar{X}$	σ^2			
Age	Mother	50	41.04	57.03	50	42.20	56.48	-1.16	.77	1.01
	Father[b]	47	46.89	70.53	49	46.59	53.95	.30	.19	1.31
Education	Mother	50	3.54	.50	50	3.76	.51	- .22	1.55	1.03
	Father[c]	48	3.46	1.27	50	3.76	.80	- .30	1.47	1.60

[a] Education of Mothers and Fathers:

1 = 3 years college through graduate work
2 = 1 or 2 years college
3 = Second to fourth year high school
4 = Fourth grade through eighth grade, 1 year high school
5 = Third school grade or below

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	100	2.63		1.98	
	[b]94	95	2.63		1.99	
	[c]96	95				
F	49/49	50/50		1.94		1.60
	[b]46/48	50/48		1.96		1.61
	[c]47/49	50/48				

revealed no significant differences between these variables and, consequently, did not differentiate between achievers and non-achievers.

The t value in Table 55 of 2.56 was significant at the .05 level of confidence and shows the socio-economic status to differentiate between the achievers and non-achievers. The mean value of 9.90 for families of achievers represented the lower end of the middle class, while the mean value of 11.44 placed the families of non-achievers between the middle and lower subdivisions of the upper lower class.

TABLE 55

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR SOCIO-ECONOMIC STATUS[a] OF FAMILIES OF ACHIEVERS AND NON-ACHIEVERS

Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	t	F
	$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Socio-economic rating	9.90	10.78	11.44	7.35	-1.54	2.56*	1.47

[a] Warner, Meeker, and Eells Scale (98):

Upper Class
1 = 1++
2 = 1+
3 = 1-

Upper Middle Class
4 = 2++
5 = 2+
6 = 2-

Lower Middle Class
7 = 3++
8 = 3+
9 = 3-

Upper Lower Class
10 = 4++
11 = 4+
12 = 4-

Lower Lower Class
13 = 5++
14 = 5+
15 = 5-

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	100	2.63		1.98	
F	49/49	50/50		1.94		1.60

Table 56 compares the height and the weight of achievers and non-achievers with norms for non-retarded children. The F values were significant at the .02 level of confidence and showed a greater

TABLE 56

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR DEVIATIONS IN HEIGHT AND WEIGHT (74) OF ACHIEVERS AND NON-ACHIEVERS

Category	Achievers			Non-Achievers			D	t	F
	N	$\bar{X}$	σ^2	N	$\bar{X}$	σ^2			
Height^{a}	49	-.70	6.27	49	-.34	13.75	.36	.57	2.19**
Weight^{b}	49	2.08	303.10	50	1.52	676.33	19.87	.13	2.23**

	Actual df	Table df	.01**	.02**	.05*	.10*
t	^{a}97	95	2.63		1.99	
	^{b}96	95				
F	^{a}48/49	50/48		1.96		1.61
	^{b}48/48	50/48				

variance for non-achievers although the t values disclosed no difference between the groups.

An examination of Table 57 clearly indicates the tendency on the part of parents to overestimate their children on the Vineland Social Maturity Scale. With this exaggerated estimation, the table indicates a significant t value of 2.33 differentiated the achieving group from the non-achieving group. The parents of the achievers had more of a tendency to overestimate their children's abilities as measured by the Vineland Social Maturity Scale. Because of the permissive nature of the interview, it was not possible to anchor the parents' responses in delimiting the performance ceiling. Under these conditions, the administration of the Vineland Social Maturity Scale would appear to be fraught with inconsisistencies and it raises speculation concerning both validity and reliability.

Table 58 compares achievers and non-achievers on early motor development and present motor coordination as judged by the mothers. The chi square value of 11.40 with 4 degrees of freedom was significant at the .05 level of confidence. This would indicate some difference in the early motor development of achievers and non-achievers. This difference was minimized when present motor coordination was evaluated. A chi square value of 3.96 revealed no significant differences in the distribution, although examination of the table shows a greater number of achievers fell into the excellent and good categories. A greater number of

TABLE 57

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS ON THE VINELAND SOCIAL MATURITY SCALE

Group	$\bar{X}$	σ^2	D	t	F
Achievers (N = 50)	103.39	224.97	7.73	2.33*	1.44
Non-Achievers (N = 50	95.66	323.64			

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	100	2.63		1.98	
F	49/49	50/50		1.94		1.60

TABLE 58

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON EARLY MOTOR DEVELOPMENT AND PRESENT MOTOR COORDINATION AS JUDGED BY THE MOTHERS

Category	Rating	Achievers	Non-Achievers	χ^2
Early Motor Development[a]	1. Excellent	7	3	
	2. Good	5	13	
	3. Fair	14	22	11.40*
	4. Poor	14	6	
	5 Very poor	9	5	
Present Motor Coordination[b]	1. Excellent	12	8	
	2. Good	18	14	
	3. Fair	8	16	3.96
	4. Poor	7	7	
	5. Very poor	5	5	

[a] N = 49 Achievers, 49 Non-Achievers.

[b] N = 50 Achievers, 50 Non-Achievers.

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

non-achievers fell into the fair category, with no difference existing between the poor and very poor category.

Table 59 presents the chi squares for illness and stigmata categories on a rating scale from 1 to 5. The chi squares revealed the distribution of categories was not significant. Table 60 presents the comparison of achievers and non-achievers on nervous mannerisms, fears, and behavioral deviations. The chi square for the nervous mannerisms was not significant, although it revealed a definite trend and approached the .05 level of significance. The differences between the two groups with respect to fears was not significant, while the chi square for behavioral deviations was significant at the .05 level of confidence and differentiated between the achievers and non-achievers. Table 61 discloses a chi square of 16.84 in comparing achievers and non-achievers on early

TABLE 59

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON ILLNESS AND PHYSICAL STIGMATA

Category	Rating	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Illness	1. None	0	0	
	2. One or two, no effect	16	8	
	3. Average	7	7	3.53
	4. Many, some effect	10	12	
	5. Excessive, traumatic effect	17	22	
Stigmata	1. None	7	6	
	2. Very little	18	15	
	3. One appearance	8	6	2.16
	4. Several	11	15	
	5. Definite handicap	6	8	

df	P .01**	P .05*
4	13.28	9.49

TABLE 60

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON NERVOUS MANNERISMS, FEARS, AND BEHAVIORAL DEVIATIONS

Category	Rating	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Nervous Mannerisms	1. None	3	0	9.28
	2. Very few	5	5	
	3. Several	11	3	
	4. Definite indication	20	26	
	5. Many	11	16	
Fears	1. None	1	0	4.72
	2. Few	12	5	
	3. Several	8	9	
	4. Serious	19	23	
	5. Many	10	13	
Behavior Deviation	1. Excellent adjustment	3	0	9.88*
	2. Mild disturbance	9	2	
	3. Few disturbances	12	10	
	4. Definitely disturbed	15	22	
	5. Severe disturbances	11	16	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

frustrating emotional experiences. Examination of the table shows that 46 out of 50 non-achievers experienced many severe, disturbing emotional experiences.

A comparison of achievers and non-achievers on walking before talking and talking before walking in Table 62 revealed a chi square significant at the .05 level. Forty-two achievers walked before they talked, 8 achievers talked before they walked, while 48 non-achievers walked before they talked, and 2 talked before they walked. Evaluating the early speech development and present speech efficiency, as judged by the mothers, in Table 63 indicates that on the basis of the parents' judgments, the

TABLE 61

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON EARLY FRUSTRATING EMOTIONAL EXPERIENCES

Frustrating Emotional Experience	Achievers (N = 50)	Non-Achievers (N = 50)
1. None or very few	1	0
2. Few, minor	8	1
3. Several	11	3
4. Many	16	16
5. Severe	14	30

χ^2	df	$P_{.01}$**	$P_{.05}$*
16.84**	4	13.28	9.49

TABLE 62

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON WALKING BEFORE TALKING AND TALKING BEFORE WALKING

Category	Achievers (N = 50)	Non-Achievers (N = 50)
Walked before talked	42	48
Talked before walked	8	2

χ^2	df	$P_{.01}$**	$P_{.05}$*
4.00*	1	6.64	3.84

TABLE 63

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON EARLY SPEECH DEVELOPMENT AND PRESENT SPEECH EFFICIENCY AS JUDGED BY THE MOTHERS

Category	Rating	Achievers (N = 48)	Non-Achievers (N = 49)	χ^2
Early Speech Development	1. Excellent	1	0	1.81
	2. Good	3	2	
	3. Fair	9	10	
	4. Poor	22	20	
	5. Very poor	13	17	
Present Speech Status	1. Excellent	2	1	1.60
	2. Good	13	10	
	3. Fair	17	17	
	4. Poor	14	15	
	5. Very poor	4	7	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

chi squares did not differentiate achievers and non-achievers.

Table 64 compares parental efforts to teach achievers and non-achievers prior to their entrance in school and regularity of subsequent school attendance. The chi squares did not differentiate between the groups. Examination of Table 65 reveals a significant F at the .01 level and a significant t at the .05 level of confidence, indicating that the achievers and non achievers were differentiated with respect to preschool training. The t and F values for the remaining categories did not differentiate the groups.

Comparison of child-parent attitudes toward school indicates agreement as shown in Table 66. On a common sense basis the attitude may reflect an interaction; if the child likes school and does well, the parent accepts the school role and may be inclined

TABLE 64

COMPARISON OF ACHIEVERS AND NON-ACHIEVERS ON ATTEMPTS MADE BY PARENT TO TEACH CHILD BEFORE SCHOOL ENTRANCE AND ON REGULAR SCHOOL ATTENDANCE

	Category	Achievers (N = 50)	Non-Achievers (N = 50)	χ^2
Attempts of Parent to Teach Child	1. To read, count, spell effectively	7	2	
	2. Some teaching	20	19	
	3. Child taught few things	14	12	6.02
	4. Child taught one thing, no learning	4	7	
	5. Never taught	4	10	
Regularity of Attendance	1. Regular attendance, rare absences	5	2	
	2. Regular attendance	21	18	
	3. Excess absences early, regular attendance now	16	4	6.24
	4. Many absences	5	6	
	5. Excess absences	3	10	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

to approve. If the child does not like school and is failing, the parent may reinforce the child by interjecting this attitude. Inspection of the subjects liked and academic disabilities (Table 67) of achievers and non-achievers showed that twice as many non-achievers as achievers liked arithmetic, while more than twice the number of achievers showed academic disabilities in arithmetic. Examination of reading as a subject disclosed that 22 of the achievers as against 4 of the non-achievers liked reading as a subject, while 3 achievers and 24 non-achievers manifested disability in reading. Table 68 presents the means, variances, difference between means, _t_ and F values for achievers and non-achievers on teachers' ratings of social maturity, appearance, prognosis, and achievement. The

TABLE 65

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, t AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS ON YEARS OF PRESCHOOL TRAINING, YEARS IN KINDERGARTEN, REGULAR SCHOOL, AND PRIVATE SCHOOL FOR RETARDED CHILDREN

	Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	t	F
		$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Years in School	Preschool	.32	.80	.04	.04	.28	2.16*	20.50**
	Kindergarten	.94	.29	.96	.43	-.02	.17	1.46
	Regular school	3.71	5.15	3.55	6.39	.16	.33	1.24
	Private school	3.17	2.64	3.32	4.72	-.15	.39	1.78

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	100	2.63		1.98	
F	49/49	50/50		1.94		1.60

TABLE 66

MEANS, VARIANCES, MEAN DIFFERENCES, AND t VALUES BETWEEN CHILD'S ATTITUDE TOWARD SCHOOL[a] AND PARENTS' ATTITUDE TOWARD SCHOOL[b] WITHIN GROUPS OF ACHIEVERS AND NON-ACHIEVERS

Group	Attitude Toward School		σ^2	$\bar{D}$	t
	Child	Parent			
	$\bar{X}$	$\bar{X}$			
Achievers[c] (N = 49)	2.17	2.15	.03	.02	.12
Non-Achievers[d] (N = 50)	3.46	3.40	.03	.06	.17

[a] Child's Attitude

1. Likes school, excellent adjustment
2. Good adjustment
3. Ambivalent
4. Some objection
5. Extreme dislike

[b] Parents' Attitude

1. Approves present situation
2. Wants more schooling, present situation acceptable
3. Ambivalent
4. Disapproves school
5. Disapproves all schools

Actual df	Table df	t.01**	t.05*
[c] 48	48	2.68	2.01
[d] 49	48	2.68	2.01

TABLE 67

COMPARISON OF NUMBER OF ACHIEVERS AND NON-ACHIEVERS ON SUBJECTS LIKED AND ACADEMIC DISABILITIES

Subject	Subjects Liked		Academic Disabilities	
	Achievers	Non-Achievers	Achievers	Non-Achievers
Arithmetic	11	22	16	6
Arithmetic, reading	2	0	1	0
Arithmetic, verbal activities	1	0	0	0
Arithmetic, spelling	0	1	1	1
Arithmetic, art	0	0	1	0
Reading	22	4	3	24
Reading, spelling	3	0	0	3
Spelling	2	0	1	2
Verbal activities	2	0	0	1
English	1	0	0	0
Social studies	0	0	1	0
Writing	0	0	1	0
Non-verbal activities	1	0	0	0
Art	0	3	0	0
Music	0	1	0	0
Physical education	0	1	3	0

TABLE 68

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, *t* AND F VALUES FOR ACHIEVERS AND NON-ACHIEVERS ON TEACHERS' RATINGS OF: SOCIAL MATURITY,[a] APPEARANCE,[b] PROGNOSIS,[c] AND ACHIEVEMENT

Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	*t*	F
	$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Social maturity	2.52	1.81	2.92	1.54	- .40	1.55	1.17
Appearance	2.48	1.60	2.32	1.49	.16	.64	1.08
Prognosis	2.52	1.07	2.84	.75	- .32	1.68	1.43
Achievement	2.50	.91	4.12	.68	-1.62	9.09**	1.34

[a] 1 to 5 scale--1 high

[b] 1 to 5 scale--1 high

[c] 1 to 5 scale--1 high

	Actual df	Table df	.01**	.02**	.05*	.10*
t	98	100	2.63		1.98	
F	49/49	50/50		1.94		1.60

t and F values for social maturity, appearance, and prognosis were not significant, but a *t* value of 9.09, significant at the .01 level, revealed the teachers' ratings on achievement differentiated the groups. A comparison of teachers' ratings of acceptance-rejection by parents of achievers and non-achievers on Table 69 gave a chi square value of 10.76, showing that the teachers were able to differentiate achievers from non-achievers on parental acceptance or rejection. Table 70 exhibits a comparison of mothers of achievers and non-achievers, fathers of achievers and non-achievers, and both mothers and fathers of achievers and non-achievers on the acceptance-rejection scale. Although the chi-square was not significant for mothers and fathers, the chi squares were sufficiently high to indicate a trend, but when the chi square was computed for both parents, it was significant at the .01 level of confidence. Examination of the table shows a greater number of acceptances and less rejections by the parents of achievers than by the parents of non-achievers, while fewer acceptances and a greater number of rejections were shown by the parents of the non-achievers.

Comparison of parents of achievers and non-achievers on agreement of parents on management of child, effect of retardation

TABLE 69

COMPARISON OF TEACHERS' RATINGS ON ACCEPTANCE-REJECTION BY PARENTS OF ACHIEVERS AND NON-ACHIEVERS

Teachers' Rating of Acceptance-Rejection	Achievers (N = 50)	Non-Achievers (N = 50)
1. Acceptance	17	12
2. Cooperative	16	8
3. Neutral, ambivalent	4	15
4. Some rejection, no cooperation	9	8
5. Rejection	4	7

χ^2	df	$P_{.01}$**	$P_{.05}$*
10.76*	4	13.28	9.49

on social life and aspiractions and goals for the child in Table 71 revealed the groups were not distinguishable on these variables. Table 72 shows a comparison of mothers of achievers and non-achievers and fathers of achievers and non-achievers on first awareness and present awareness of retardation. The chi squares did not differentiate the achievers from the non-achievers. The chi square values on a comparison of mothers of achievers and non-achievers and fathers of achievers and non-achievers on general attitude toward retardation in Table 73 did not differentiate the groups and showed a scatter of the variables without significance.

In comparing mothers and fathers of achievers and non-achievers on attitude toward siblings as shown in Table 74, the table provides a distribution in the different categories. The chi square values did not suggest differentiation of the groups on these variables.

While Table 75 did not differentiate the groups in indentification of male and female achievers and non-achievers with mother and father, inspection of the table highlights some interesting observations.

1. Of the 23 females in the achiever group, 21 identified with the mother while only 1 identified with the father and 1 exhibited ambivalence.

TABLE 70

COMPARISON OF MOTHERS OF ACHIEVERS AND NON-ACHIEVERS, FATHERS OF ACHIEVERS AND NON-ACHIEVERS, AND BOTH MOTHERS AND FATHERS OF ACHIEVERS AND NON-ACHIEVERS ON ACCEPTANCE-REJECTION SCALE

	Group	Acceptance-Rejection Scale					χ^2
		1 Complete Acceptance	2 Acceptance with Reservations	3 Ambivalence	4 Rejection	5 Over-Rejection	
Mother	Achievers (N = 50)	5	9	8	19	9	8.22
	Non-Achievers (N = 50)	0	4	9	25	12	
Father	Achievers (N = 50)	4	10	8	10	18	8.22
	Non-Achievers (N = 50)	1	3	14	15	17	
Both Parents	Achievers (N = 50)	9	19	16	29	27	15.04**
	Non-Achievers (N = 50)	1	7	23	40	29	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

TABLE 71

COMPARISON OF PARENTS OF ACHIEVERS AND NON-ACHIEVERS ON: AGREEMENT OF PARENTS ON MANAGEMENT OF CHILD, EFFECT OF RETARDATION ON SOCIAL LIFE, AND ASPIRATIONS AND GOALS FOR CHILD

Category		Parents		χ^2
		Achievers (N = 50)	Non-Achievers (N = 50)	
Management of Child	1. Almost always agree	9	6	6.20
	2. More agreement than disagreement	13	15	
	3. Ambivalent	3	10	
	4. More disagreement than agreement	10	5	
	5. Never agree or broken home	15	14	
Effect of Retardation on Social Life	1. Increased	4	8	4.58
	2. Some improvement	2	3	
	3. No difference	35	33	
	4. Some retreat, many moves	6	6	
	5. Isolation	3	0	
Aspirations and Goals for Child	1. Realistic	12	10	1.24
	2. Possible plans	10	14	
	3. Uncertain	11	12	
	4. Above expectations	14	12	
	5. Completely unrealistic	3	2	

df	$P_{.01}$ **	$P_{.05}$ *
4	13.28	9.49

TABLE 72

COMPARISON OF MOTHERS OF ACHIEVERS AND NON-ACHIEVERS AND FATHERS OF ACHIEVERS AND NON-ACHIEVERS ON FIRST AWARENESS AND PRESENT AWARENESS OF RETARDATION OF CHILD

Group			Awareness					χ^2
			1 Excellent	2 Good	3 Fair	4 Poor	5 Completely Unaware	
First Awareness	Mother	Achievers (N = 50)	5	12	13	18	2	5.58
		Non-Achievers (N = 49)	2	5	19	21	2	
	Father	Achievers (N = 50)	20	8	10	8	4	1.59
		Non-Achievers (N = 49)	14	10	10	10	5	
Present Awareness	Mother	Achievers (N = 48)	3	11	15	11	8	6.77
		Non-Achievers (N = 50)	0	7	17	20	6	
	Father	Achievers (N = 48)	18	5	7	8	10	1.13
		Non-Achievers (N = 50)	14	7	9	9	11	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

TABLE 73

COMPARISON OF MOTHERS OF ACHIEVERS AND NON-ACHIEVERS AND FATHERS OF ACHIEVERS AND NON-ACHIEVERS ON GENERAL ATTITUDE TOWARD RETARDATION

Group		General Attitude Toward Retardation					χ^2
		1 Sympathy	2 Help	3 Neutral	4 Avoidance	5 Repulsed	
Mother	Achievers (N = 50)	14	14	7	6	9	1.88
	Non-Achievers (N = 50)	16	12	11	5	6	
Father	Achievers (N = 50)	9	13	6	7	15	5.00
	Non-Achievers (N = 50)	12	15	11	4	8	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

TABLE 74

COMPARISON OF MOTHERS OF ACHIEVERS AND NON-ACHIEVERS AND FATHERS OF ACHIEVERS AND NON-ACHIEVERS ON ATTITUDE TOWARD SIBLINGS

Group		Attitude Toward Siblings					χ^2
		1 No Difference in Affection	2 Some Preference for Siblings	3 Ambivalent	4 Poor Understanding of Siblings	5 Rejection of Siblings	
Mother	Achievers (N = 47)	12	17	7	8	3	1.16
	Non-Achievers (N = 44)	12	13	6	11	2	
Father	Achievers (N = 46)	11	14	9	11	1	4.73
	Non-Achievers (N = 45)	12	9	8	10	6	

df	$P_{.01}$**	$P_{.05}$*
4	13.28	9.49

TABLE 75

COMPARISON OF IDENTIFICATION OF MALE AND FEMALE ACHIEVERS AND NON-ACHIEVERS WITH MOTHER AND FATHER

	Group	Identification					2
		1 Father	2 Mother	3 Father Some Mother	4 Mother Some Father	5 Mixed	
Female	Achievers (N = 23)		21	0	0	1	1.29
	Non-Achievers (N = 11)	0	10	0	1	0	
Male	Achievers (N = 27)	10	2	8	4	3	3.42
	Non-Achievers (N = 39)	8	2	13	12	4	

df	P .01**	P .05*
4	13.28	9.49

2. Of the 27 achieving males, 10 identified with the father, 2 with the mother, the remaining 15 evidenced ambivalence.
3. Of the 11 female non-achievers, 10 identified with the mother, and of the 39 non-achieving males, only 8 identified with the father.
4. In both achievers and non-achievers, the males gave greater evidence than the females of some degree of ambivalence. Although 15 of the male achievers showed ambivalent identification, 29 of the male non-achievers revealed this same tendency.

A comparison of siblings and moves made by the family on Table 76 showed F values significant at the .02 and .10 levels. The achieving and non-achieving groups were differentiated by both numbers of siblings in the family and moves made by the family.

MEANS, VARIANCES, DIFFERENCE BETWEEN MEANS, $\underline{t}$ AND F VALUES FOR NUMBER OF SIBLINGS[a] AND NUMBER OF MOVES MADE[b] BY FAMILIES OF ACHIEVERS AND NON-ACHIEVERS

Category	Achievers (N = 50)		Non-Achievers (N = 50)		D	$\underline{t}$	F
	$\bar{X}$	σ^2	$\bar{X}$	σ^2			
Siblings in family	2.84	.18	2.78	.30	.06	.62	1.67*
Moves made by family	3.08	.69	3.18	1.46	-.10	.48	2.12**

[a] Siblings in Family

1 = 0
2 = 1
3 = 2 to 5
4 = 6 to 10
5 = 10

[b] Moves Made by Family

1 = 0
2 = 1 to 3
3 = 3 to 5
4 = 5 to 10
5 = Over 10

	Actual df	Table df	.01**	.02**	.05*	.10*
$\underline{t}$	98	100	2.63		1.98	
F	49/49	50/50		1.94		1.60

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

This project was designed to investigate patterns of behavior which may differentiate achievers from non-achievers among non-institutionalized mentally retarded children with intelligence quotients ranging between 60 and 75. If the factors which influence the establishment of behavior patterns that differentiate achievers from non-achievers can be adequately detected and understood, this information would provide valuable guidance and direction in the construction of a framework for more adequate curricula and extracurricular activities. These programs would be consistent with child development rather than remedial principles and would expedite and facilitate physical, emotional, intellectual, social and personality growth and adjustment.

Fifty achieving and 50 non-achieving mentally retarded children with intelligence quotients between 60 and 75 as measured by the Revised Stanford Binet Form L were selected from a pool of approximately 200 in public school special classes in Port Washington, Great Neck, Mineola, Roslyn, Long Island; and Binghamton, New York.

The groups were arbitrarily subdivided into achievers and non-achievers on the basis of their performance on the Metropolitan Achievement Test. The achieving group was defined as functioning at their Binet mental age level or higher. The non-achieving group was defined as functioning at least one school year below their mental age. Achievers and non-achievers did not differ with respect to chronological age, mental age, and intelligence quotient, but differed significantly in achievement at the .01 level of confidence. Upon the completion of the selection process the following test battery was administered to all the subjects:

1. Revision of the Leiter International Performance Scale (1948),
2. Draw-A-Person (Machover),
3. The Bender Motor Gestalt,
4. Draw-A-Man (Goodenough),
5. The Rorschach Psychodiagnostic,
6. The SRA Primary Mental Abilities.

Speech and language characteristics of achieving and non-achieving mentally retarded children, including auditory and visual skills, oral and peripheral structure and function, muscular control for speech, articulatory proficiency, and oral language of achievers and non-achievers were studied. The investigation of language included mean length of response, completeness of sentence, elaboration of sentences, number of one-word responses, proportion of parts of speech, and number and nature of grammatical errors.

Fifty achieving and 50 non-achieving mentally retarded children were selected from public school special classes in Port Washington, Great Neck, Mineola, Roslyn, and Manhasset, Long Island; and Binghamton, New York. The intelligence quotients for the population ranged between 60 and 75. Normal hearing was defined by pure tone individual audiometry. Achievers and non-achievers did not differ with respect to chronological age, mental age, and intelligence quotient but they differed significantly in achievement level at the .01 level of confidence.

The children were tested for auditory abilities, visual skills, oral and peripheral structure and function, muscular control for speech, sensorimotor involvement, articulatory proficiency, and spontaneous language.

Five tests evaluated auditory abilities:

1. Auditory Recognition,
2. Auditory Retention Span,
3. Following Directions,
4. Following a Paragraph,
5. Following a Story.

Testing for visual skills included:

1. Matching Picture with Picture,
2. Matching Letter with Letter,
3. Matching Number with Number,
4. Matching Word with Picture,
5. Matching Sentence with Sentence,
6. Matching a Single Word with a Word in Sentences.

The oral and peripheral examination utilized tongue blades, flashlight, mirror, counter, stop watch, and balloons. Deviations in structure and function of occlusion, tongue, teeth, and velum were scored on a 5-point continuum. Muscular control for speech was tested by ten tasks involving coordinated movement of the articulators. Tests of sensorimotor involvement consisted of stimulus words spoken by the examiner and repeated once by the child. Lips, tongue, palate, and complex coordinations were scored as units.

Consonants, vowels, diphthongs, and blends were tested with a picture articulation test. For each error stimulability was provided in isolation, nonsense syllables, and words. Deviations were classified as omissions substitutions, and distortions. Reactions to stimulability were recorded and categorized.

Fifty spontaneous utterances were obtained for each subject for the purpose of evaluating oral language.

The social worker's objective included obtaining as complete a picture of each child as possible, as well as the important people in his environment. Her procedure began with a conference with the project director and project consultants.

1. preliminary conference with the school personnel, including prinicpal, project psychologist, supervisor, and other school personnel;
2. conferences with the teachers after the subjects had been selected;
3. examination of all records including school and case history information;
4. interview with the child;
5. dispatching of letter to each parent requesting permission for child to participate in the project as well as arranging time for interview;
6. actual interview with each parent;
7. administration of the Vineland Social Maturity Scale;
8. follow-up father interview;
9. termination of the relationship with the family.

Conclusions

1. The vocabulary subtest and the number of year levels on the Stanford-Binet Intelligence Scale did not differentiate achievers from non-achievers.
2. The achievers' performance on the Metropolitan Achievement Test was significantly superior to that of the non-achievers in verbal and non-verbal categories. Furthermore, when a comparison was computed between the means for differences between arithmetic fundamentals and arithmetic problems for

each group, both the achievers and non-achievers scored higher on the arithmetic fundamentals test. This result would support previous findings that individuals score higher on an arithmetic test of computation than on an arithmetic problem test employing verbal material.

3. Performance on the Revision of the Leiter-International Scale (1948) did not differentiate the achievers from the non-achievers. Inspection of the intelligence quotients on the Stanford-Binet and Leiter reveals that the Leiter scored the achievers and non-achievers 6 to 7 points lower than the Binet.
4. While 4 more achievers identified more positively on the Draw-A-Person Test, the difference was not sufficiently large enough to differentiate the groups.
5. Significant F values appeared at the .01 level indicating that the non-achievers were more varied on Card 1 of the Bender-Motor Gestalt Test with respect to the contact category; on Card 2 for orientation; on the number category for total score, and number of cards completely passed and failed. But in a test containing so many F's, 5 percent may be expected to prove significant by chance.
6. Three F values significant at the .01 level suggest greater variability for the non-achievers on the Draw-A-Man Test. This suggestion is made with caution and may not be entirely warranted. None of the t values was significant. Comparison of the intelligence quotients on the Draw-A-Man and the Stanford-Binet shows that the Draw-A-Man and the Stanford-Binet scored both achievers and non-achievers approximately equal.
7. Investigation and evaluation of the performances of the achievers and non-achievers on the Rorschach Psychodiagnostic revealed statistically significant t and F values. When evaluated from empirical and clinical criteria, the statistically significant values were not operationally meaningful or significant in differentiating the groups. The clinical and statistically significant results obtained, while not differentiating the achievers from the non-achievers, indicated that as a combined group they were similar to the 8-year-olds of the Ames study in their likes and dislikes for chromatic over achromatic Rorschach cards, and in their preference for Card 10 as the card liked best and for Card 4 as the card liked least.

Since the underlying assumption in scoring the Rorschach categories was that these category scores were not distributed normally nor additive, but were related to total R, they did not lend themselves to statistical analysis with any degree of confidence. Furthermore, lack of adequate standardization norms for mentally retarded children did not permit a comparison among themselves or with normals. Additional objections to a statistical treatment of the Rorschach included the influence of chronological age on the subjects and the realization that by quantification and equal treatment of certain responses, important information becomes contaminated and not available for analysis.

8. The SRA Primary Mental Abilities, for ages 5 to 7, did not differentiate the achievers from the non-achievers.

9. The SRA Primary Mental Abilities, for ages 7 to 11, differentiated the groups on subtests requiring verbal problem solving and generalization behavior as opposed to concrete, pictorial tasks requiring minimal verbal behavior. Whether these differences are indicative of Primary Mental Abilities or tap the same or equivalent resources as the verbal subtests of the Metropolitan Achievement, introduces speculation and requires serious exploration.

10. Performance on auditory skills did not differentiate achievers from non-achievers.

11. Time intervals required to perform visual tasks did not show differences between achievers and non-achievers with the exception of the most complex task, matching a word with the word in sentences. Achievers were superior to non-achievers at the .05 level of significance. The performance of the non-achievers also exhibited significant variability for ten tasks at the .02 level.

12. Oral-peripheral structure and function did not differentiate achievers from non-achievers.

13. Items correct in muscular control for speech showed no differences between the two groups.

14. Lips, Tongue, Palate, and Complex Coordinations sections done correctly by achievers and non-achievers indicated no differences.

15. There were no differences between achievers and non-achievers on number of correct articulations; neither were correct articulations correlated with chronological age with the exception of the medial consonant position for achievers where it was significant at the .05 level.

16. The chi squares for omissions, substitutions, and distortions in the medial and final consonant positions differentiated achievers and non-achievers in the articulation test. Non-achievers omitted and substituted sounds more frequently than achievers; while achievers distorted more sounds than non-achievers at the .01 level.

17. Stimulability reactions also differentiated achievers from non-achievers. Comparing stimulation on consonants for achievers and non-achievers reflected a tendency for the non-achievers to correct the sounds more often than for the achievers at the .01 level, while the achievers corrected sounds more often than did the non-achievers in isolation and nonsense syllables, but not in words. Achievers modified the severity of distortion more adequately than non-achievers at the .01 level; achievers also exhibited a tendency to change from a less severe to a more severe distortion in stimulation on blends at the .05 level of confidence.

18. While statistical evaluation of the structure of language did not differentiate achievers and non-achievers, a comparison with normal subjects in mean length of response and percent of total elaborated sentences indicated that the non-achievers were a year and a half more retarded than achievers on the same scales. Empirically this would appear to be an important gain for the achievers since they were using language at a higher level than were the non-achievers.

19. In percentage of parts of speech, achievers used more nouns than the non-achievers used, while the non-achievers used more verbs. The differences between these groups were significant at the .05 level. When compared with normal subjects, both groups fell below the 3-year level in the use of adjectives and adverbs.

20. Non-achievers used more colloquialisms-slang and made more word approximations at the .01 level. Rank order of errors in both groups resembled rank order of deviations for much younger normal children.

21. Mean length of response and total elaborated sentences were significantly correlated with chronological age, mental age, and intelligence quotient for the achievers. For the non-achievers, mean length of response and total elaborated sentences were similarly correlated with chronological age and mental age but not with intelligence quotient.

22. The families of the achieving group, as a whole, fell into a better socioeconomic status than the families of the non-achievers. The groups were differentiated in this at the .05 level of confidence.
23. The non-achievers showed significant variance from the achievers at the .02 level of confidence in height and weight as compared with the normal children.
24. Both the parents of achievers and non-achievers overestimated their children's social maturity when measured by the Vineland Social Maturity Scale. Nevertheless, the parents of the achievers tended to overestimate their children's social maturity more than the parents of the non-achievers at the .05 level of confidence. The permissive nature of the interview did not permit delimiting the performance ceiling on this scale. Under these conditions both the validity and reliability of the Vineland Social Maturity Scale became extremely vulnerable and open to serious conjecture.
25. While a difference in early motor development of achievers and non-achievers, as judged by the mothers, existed in the social history, this difference disappeared as the children grew older.
26. A comparison of the achievers and non-achievers on nervous mannerisms reflected a definite trend in the symptomatic behavior in non-achievers.
27. Behavioral deviations differentiated achievers and non-achievers at the .05 level of confidence. The non-achievers exhibited more behavior disturbances.
28. Non-achievers had more early emotional and thwarting disturbances than the achievers at the .01 level of confidence. Forty-six of the 50 non-achievers suffered early severe, disturbing, and frustrating emotional experiences.
29. More achievers than non-achievers talked before they walked, at the .05 level of confidence.
30. The achievers were differentiated from the non-achievers at the .05 level of confidence in terms of the number of years of preschool training. The achievers were subjected to early preschool training.
31. The children and parents of the achievers and non-achievers agreed on their attitude toward school.
32. Teachers' ratings of achievement differentiated the achievers from the non-achievers at the .01 level of confidence.

33. A comparison of the acceptance-rejection of achievers and non-achievers by mothers and fathers, while not significant, revealed a definite trend of more rejection by mothers and fathers of non-achievers. When both parents were combined as a group, the chi square of the parents of achievers and non-achievers on acceptance-rejection was significant at the .01 level of confidence. The parents of non-achievers showed greater rejection.

34. While identification with the mother or father by female and male achievers and non-achievers did not differentiate the groups, the investigation revealed interesting differences between the groups. Both male achievers and non-achievers tended to identify less with the father than female achievers and non-achievers identified with the mother. Fifteen of the male achievers manifested ambivalent identifications, while 29 of the male non-achievers evidenced ambivalence.

Implications

Since the Leiter and the vocabulary subtest of the Binet did not differentiate the groups, a more extensive exploration of these tests is indicated. Such a study should include rigorous selection and control of subjects of a larger population and thorough statistical analysis of all the subtests of these two intelligence scales. In the prosecution of this analysis an essential prerequisite demands that the range of the groups not only be similar, but that a sufficient number of subtests should fall in each category to facilitate comparison analysis at a high level of confidence.

The investigation raised some question as to the effectiveness of the Metropolitan Achievement Test for identifying non-achievers. Further consideration should be devoted to an operational definition of achievers and non-achievers.

Time limitations prevented a more thorough analysis of the Draw-A-Person Test. Experience revealed that identification based solely on the subject's verbal identification was not adequate. Many drawings, verbally identified by the subjects as males or females, suggested no objective sexual identification, and at times presented the antithesis of the subject's estimate. A more thorough procedure, employing both subject's estimation and appearance of the drawings, may reveal more reliable information.

The objections to the use of statistical procedures with the Rorschach may be alleviated or minimized if each protocol was evaluated as a whole and rated individually on a quantitative scale as to adjustment, emotional stability, perceptual organization, stereopathy and reality testing. The quantitative results on the rating scale would expedite and permit comparison between the experimental and control groups.

Theoretically and operationally, the value of imposing the concept of scholastic achievement on mentally retarded children may be vulnerable to criticism. The concept of achievement should be standardized and norms should be applicable to the mentally retarded population. Such a procedure would obviate comparison and eliminate the drive to make the mentally retarded a carbon copy of the normal child. Exposing the child to experiences that make for growth in all areas of personality and social development may disintegrate the barriers not conducive to the development of an adequate self-concept and would provide the child with security in the social and economic worlds without pain or embarrassment.

The tests of auditory skills used in this research did not differentiate achievers from non-achievers. Apparently most of the autocritical abilities for phonetic discrimination are learned early. Since it is possible that the tasks used in this study did not present different levels of difficulty throughout the mental age range of the subjects, future tests should be constructed to embrace nonsense syllables or ambiguous auditory cues.

Non-achievers were different from achievers in the structure of language nature of articulatory errors, and reactions to stimulability. While both groups were retarded in language when compared with normal children, non-achievers presented a greater degree of retardation than achievers. All of the children had many omissions, substitutions, and distortions of speech sounds; non-achievers omitted and substituted sounds more frequently, while achievers had more distortions. The results of stimulability were sufficiently varied to indicate the need for further specific study in this area. The language and speech findings of this investigation suggest a reappraisal and reevaluation of present instructional methods, a revised curriculum evolving about a language communicative frameword rather than motor articulatory movements. These curricula should be pupil-centered based upon their own needs and conceptual developmental levels rather than on elementalistic drill procedures.

Since this investigation revealed differences between the achievers and non-achievers among mentally retarded children with intelligence quotients between 60 and 75, the same techniques might be extended both a higher and lower levels.

1. The results of this investigation strongly recommend the imperative need for the establishment of agencies to provide early education, counseling, and guidance for parents of mentally retarded children. By such a process it may be possible to structure satisfactory emotional climate in the home conducive to the development

of satisfactory child-parent relationships and consequently prevent early disturbing emotional experiences. Through this means, also, the parents may have an opportunity to work out an acceptable relationship both with the child and other important people in the child's environment.

2. Concomitantly, preschool training centers might be established as part of the over-all counseling and guidance program. Such centers also should include parent education and cooperation on a realistic level.
3. With proper orientation of the parents, school activities embracing a non-threatening core should provide a continuous reconstruction of pleasant experiences for the child.
4. With proper counseling and guidance and with proper participation in their children's educational development, the parents may desist from an unrealistic appraisal of the child's behavior and facilitate adjustment of the parents' aspiration and goals with the children's aspirations, goals, and achievement levels.
5. The question of identification, especially in the early years of the child's life, demands further study with respect to its influence on the child's consequent behavior.

An appropriate program requires the participation of many individuals and the contribution of many talents--physical, emotional, psychological, and social. The emphasis on this kind of program should stress medical care, proper early diagnosis, placement, provision and development of a psychological climate fluid enough to permit parent and child interaction sufficiently secure to enhance movement within society without pain, embarrassment, and feelings of guilt. Proper establishment of a curriculum should be based on developmental principles rather than remedial concepts and should provide physical, educational, psychological and social experiences on a realistic continuum.

APPENDICES

APPENDIX A

PSYCHOLOGICAL SCORING PROCEDURES

SCORING PROCEDURES

Individual figures A through 8; score one point for each of the following categories:[1]

1. O--Orientation.--the relationship of the component parts of the figure (the drawing as it appears on the B-g Card) to the page.
2. D--Distortion.--no distortion of the component parts of the figure.
3. N--Number.--reproduction of most of the parts of the figure.
4. C--Contact.--component parts touching or not touching as represented in the figure.
5. G--Gestalt.--if above four are scored correct and drawing resembles figure on the Card.
6. O--Organization.--score five points. This category is applied to all the reproductions on the page.

A logical sequence of drawings on one side of a blank (8 1/2 x 11) sheet of paper with no overlap of figures should be present, and at least 50 percent of the area of the page should be used.

A maximum of 5 points can be assigned to each card, 45 points for all nine cards, plus 5 points for organization, and 50 points for the total test. The following section will present the scoring criteria for each card using the above defined categories.

Card A

O--Orientation.--a score for this category requires the appearance of 2 figures relatively close to each (irrespective of distortion), and approximately parallel. The rectangular (square) figure must always appear to the right of the rounded (circle) figure. If the subject turns the page around, or the card, so that the figure on the page is oriented correctly to him, one point is allowed.

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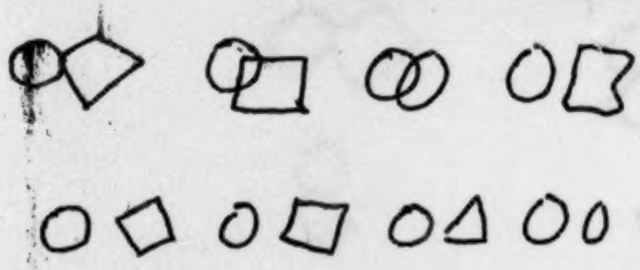
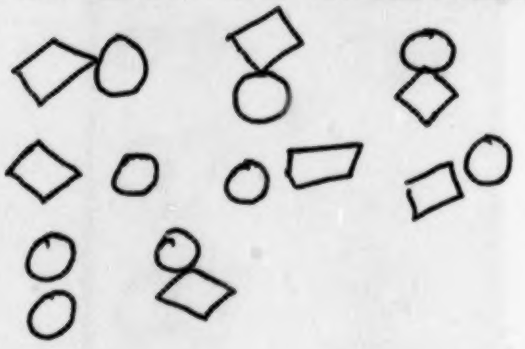
[1] The names chosen for these categories embrace a wide area of clinical and perceptual concepts actually stated or referred to in the literature. The examiner's interest was twofold--to explore if the groups differed on a "category" level as well as total score, and to apply this procedure and concepts to future research in perceptual development in children.

Score for Orientation

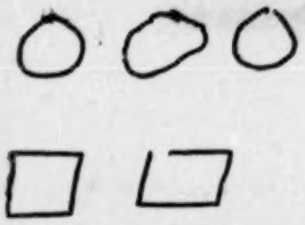


No Score for Orientation

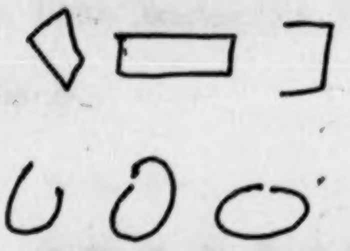


D--Distortion.--scoring for Distortion requires both figures to be drawn correctly, and the angles of the square must approximate right angles. The child must draw at least 3 right angles. The only angle distortion permitted is the angle of contact with the circle. Flexibility of the contact angle was permitted because of the additional variables involved in completing the total Gestalt, which may differ from the variables involved in completing the 3 remaining angles. The angle distortion should be reasonable and should not deviate more than 30 degrees in either direction, as long as it joins the circle. The circle form should approximate roundness, and should be practically closed, although a small opening is permitted.

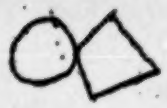
Score for Distortion



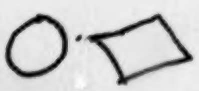
No D Score



Angle Distortion



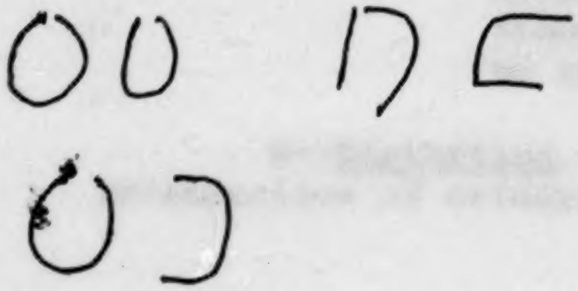
Score D because of contact



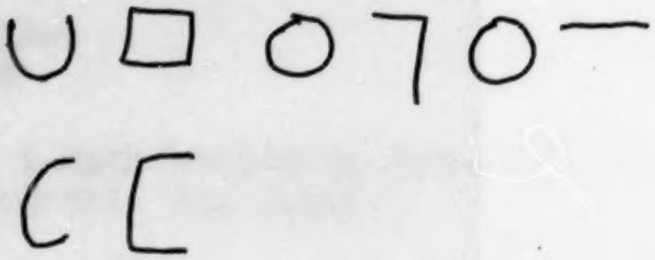
No D score

N--Number.--two figures must appear to score for number and at least three-fourths of each figure must be completed.

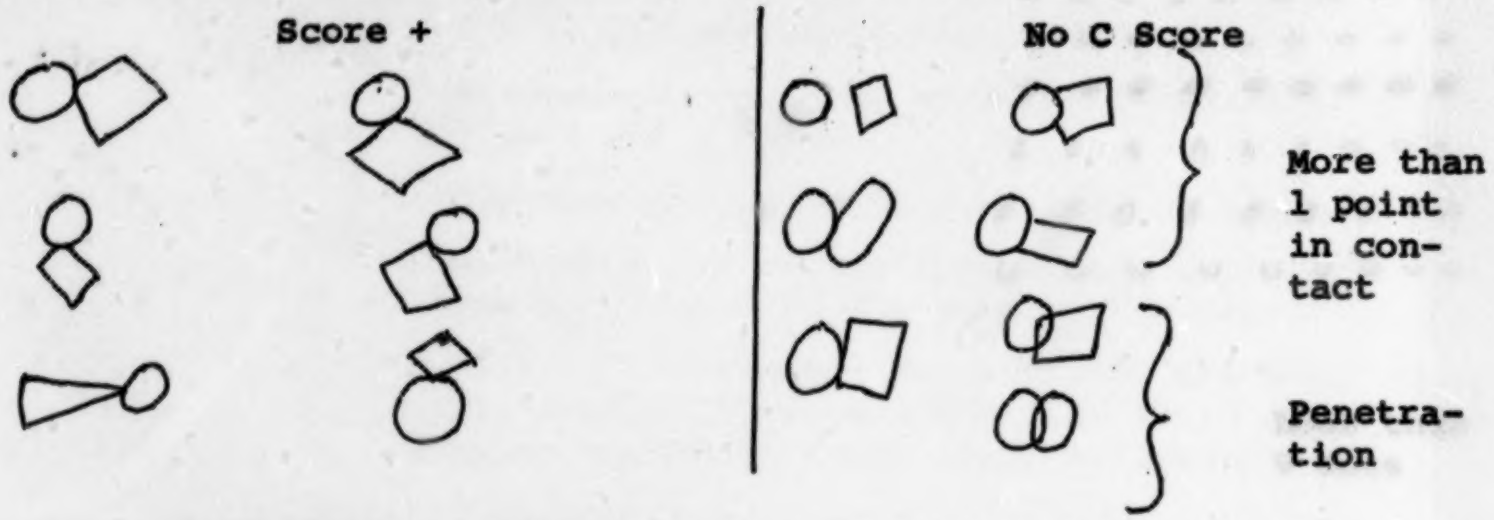
Score for N



No Score for N



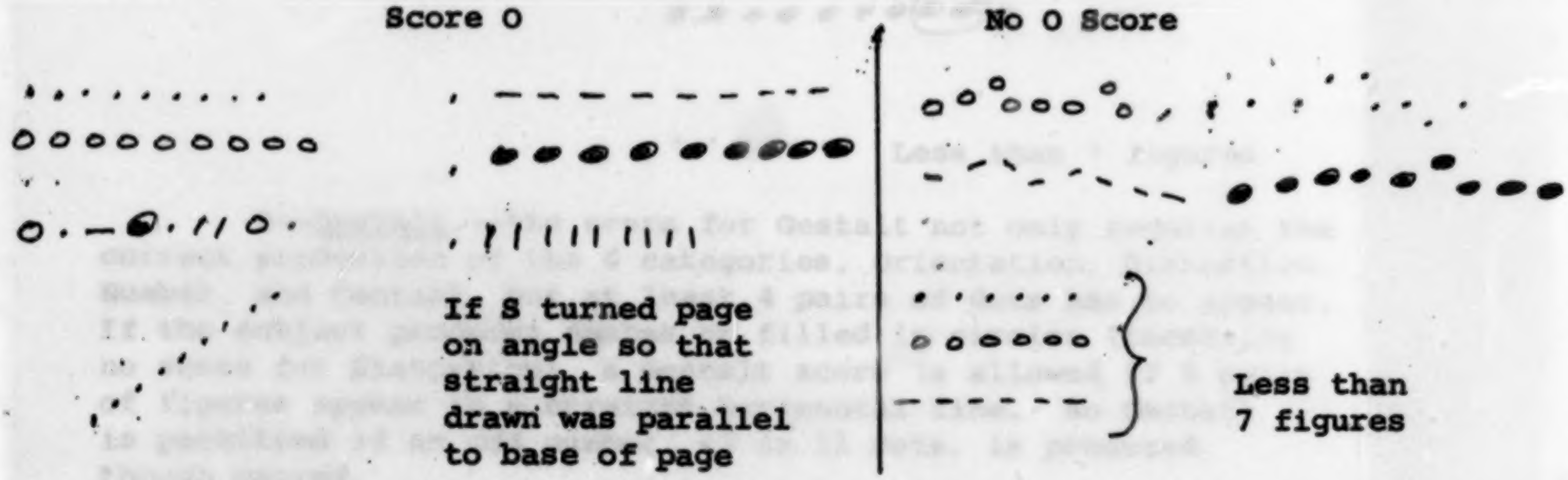
C--Contact.--in scoring for Contact, the point of the angle must represent a point in the circumference of the circle.


Score +
No C Score
More than 1 point in contact
Penetration

G--Gestalt.--the score for Gestalt is obtained when the 4 categories Orientation, Distortion, Number and Contact are not only correct, but the completed drawing is reasonably perfect. A Gestalt score is not allowed when the subject reproduces 3 right angles and the remaining 1 is distorted. The G score for this card demands exact contact of the figure with no distortion, tilted square and proper Orientation and Number.

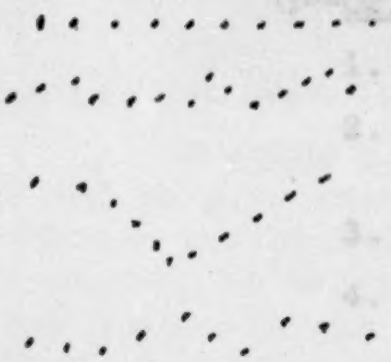
Card 1

O--Orientation.--credit for Orientation is allowed when at least 7 dots or circles or small dashes are produced in a straight horizontal line parallel to the bottom of the page.

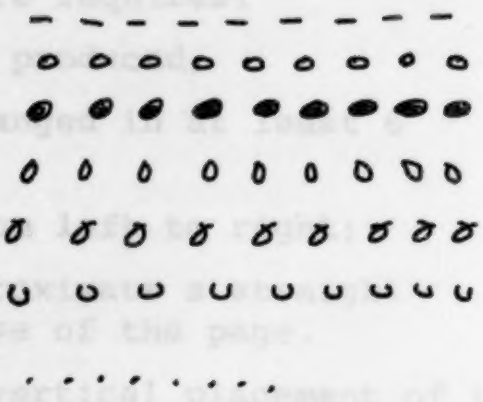

Score O
No O Score
If S turned page on angle so that straight line drawn was parallel to base of page
Less than 7 figures

D--Distortion.--at least 9 dots should be produced correctly, irrespective of Orientation or Contact, for credit.

Score for +



No D Score

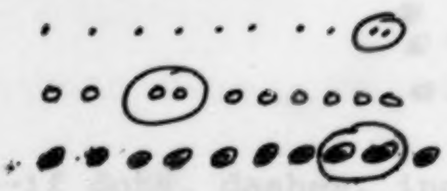


Less than 9 dots

N--Number.--credit is permitted when a production of at least 9, and no more than 15 figures (dots, circles, dashes, shaded circles, etc.) appear, irrespective of Orientation and Contact. In the examiner's opinion a production of more than 15 dots reflects perseverative tendencies.

C--Contact.--credit is allowed when all figures are separated. No score is permitted if any contact is made. The subject has to produce 7 figures before contact can be scored.

No C Score



Less than 7 figures

G--Gestalt.--the score for Gestalt not only requires the correct production of the 4 categories, Orientation, Distortion, Number, and Contact, but at least 4 pairs of dots has to appear. If the subject produces dashes or filled in circles (receiving no score for Distortion), a Gestalt score is allowed if 5 pairs of figures appear in a straight horizontal line. No Gestalt is permitted if an odd number, 13 or 11 dots, is produced, though paired.

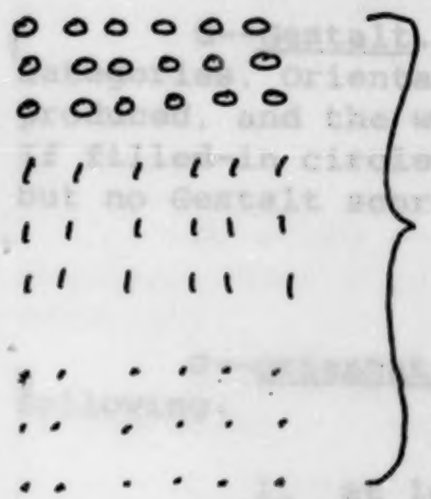
Card 2

O--Orientation.--Orientation score requires:

1. that 18 figures should be produced;
2. the figures should be arranged in at least 6 columns and 3 rows;
3. they should be slanted from left to right;
4. the bottom row should approximate a straight line horizontal to the base of the page.

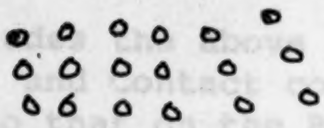
While credit is not allowed for vertical placement of the figures in columns, credit is allowed when the angle of slant is uniform. A leeway of 30 degree slant (left to right) is permitted.

No O Score

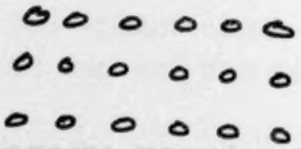


No slant

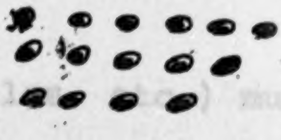
No Score for O



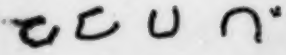
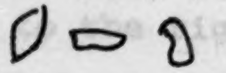
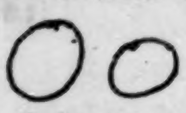
Bottom row is not a straight horizontal line



Slant in wrong direction



Less than 18 figures

D--Distortion.--if dots, dashes, incompleted circles  , distorted circles  , or circles 3 times the size shown  , are produced, no score is allowed.

If the subject draws 3 rows and 9 or more columns, 20 correct circles must be present. The examiner feels that 20 correct responses represents sufficient adequacy in carrying out this psycho-motor task.

If the subject completes 3 rows and 4 columns, 90 percent of the figures has to be correct.

No Distortion score is allowed when the subject produces 3 rows and less than 4 columns.

If the subject completes 2 rows and 5 or more columns the figure has to be 100 percent correct.

No Distortion credit is allowed if the subject draws 2 rows *and less than 5 columns.*

Note: filled in circles ● ● are correct for a Distortion score, but when represented, no Gestalt score can be given.

N--Number.--a Number score is credited when no less than 9 and no more than 15 columns (3 dots in each) are produced. Columns containing 2 dots receives no score for Number, and similarly no score for Number is allowed when more than 15 columns are produced. In the examiner's opinion, a production of more than 15 columns reflects perseverative tendencies.

C--Contact.--to receive a score for Contact:

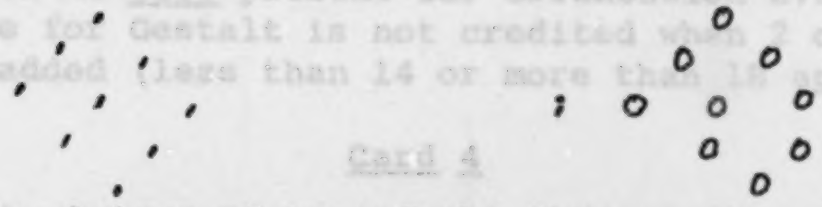
1. at least 5 columns (3 dots in each) has to be produced;
2. all figures are separated (see Contact, Card 1).

G--Gestalt.--credit for Gestalt includes the above 4 categories, Orientation, Distortion, Number, and Contact correctly produced, and the whole drawing is similar to that on the B-g Card. If filled-in circles are used, a correct D score is permitted, but no Gestalt score is allowed.

Card 3

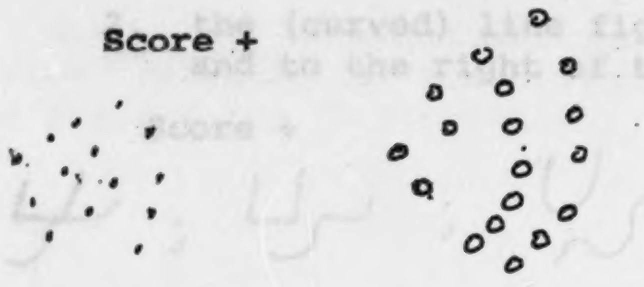
O--Orientation.--a score for this category requires the following:

1. at least 8 figures (dots, circles, etc.) must be present;
2. the 8 figures should be drawn so that one dot and two arced rows appear to the right of the solitary figure:

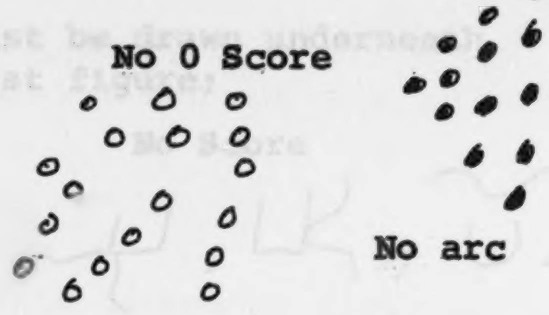


3. a minimum of two of the three center points (dots), in the arcs, should be crawn in a straight line with the solitary dot and parallel to the base line of the card.

Score +



No 0 Score



Slight tilting of the whole drawing in relation to the base line in either direction is permissible.

D--Distortion.--scoring for Distortion requires the following criteria:

1. when 12 figures are drawn, 10 must be correct;
2. when 13 to 14 figures are drawn, 11 should appear correct;
3. when 15 or more figures are drawn, 12 must be correct.

No score for Distortion is permitted for less than 8 figures. When 8 to 11 figures appear, all must be produced correctly.

N--Number.--credit is allowed for Number when at least 12 and no more than 20 figures are drawn.

C--Contact.--a score for Contact requires all the figures to be separated. No score is permitted if any contact is made. The subject has to produce at least 8 figures before contact can be scored. (Refer to Contact criteria for Card 1.)

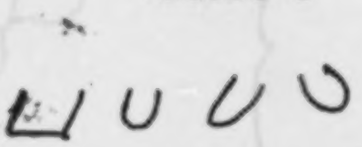
G--Gestalt.--the score for Gestalt requires the correct production of the 4 categories, Orientation, Distortion, Number, and Contact, with no tilt present for Orientation even within limits. A score for Gestalt is not credited when 2 or more dots are omitted or added (less than 14 or more than 18 appear).

Card 4

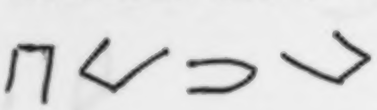
O--Orientation.--credit for Orientation includes:

1. the base of the incomplete square must be approximately parallel to the bottom of the page;

Score 0

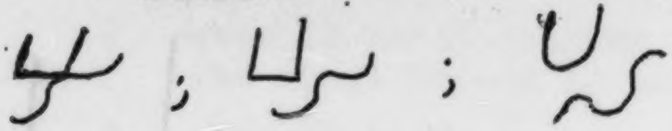


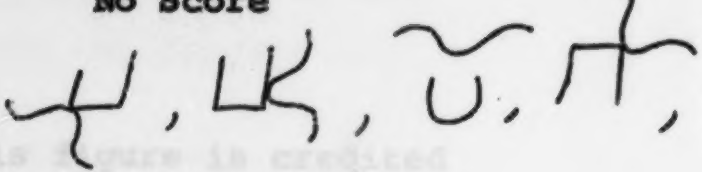
No Score for 0

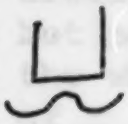


2. the (curved) line figure must be drawn underneath and to the right of the first figure;

Score + **No Score**



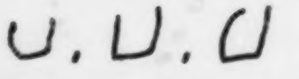


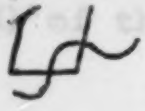


Both 1 and 2 must be correct to receive a score for Orientation.

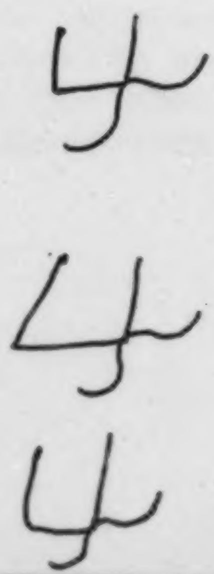
D--Distortion.--credit for Distortion requires:

1. the incomplete figure be drawn so that it has 3 sides; the angles be right angles, though slight variation in the right corner angle is permitted especially when in contact with the curved line (see Card A);
2. the curved line should possess roundness and two tails.

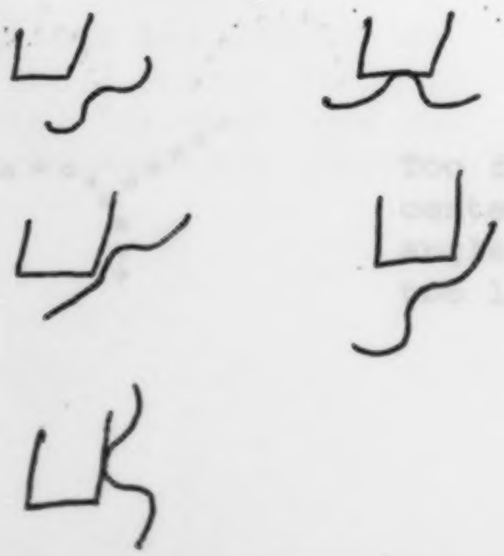
N--Number.--to score for number, three-fourths of the curved line and all of the 3 sides of the incompleted square must be present. Where the angles are smooth,  , the rounded area is considered as one side and credit is permitted.

C--Contact.--to qualify for a Contact score, the rounded part of the curved line should touch the vertex (at one point, see Card A) of the right angle of the incompleted square. No penetration of the figures  is permitted.

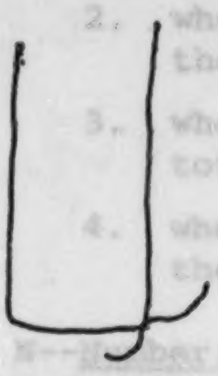
Score + **Score -**



Angles on left need not be 90 degrees and may be rounded



G--Gestalt.--credit for Gestalt is allowed when all other categories, Orientation, Distortion, Number and Contact are correct and the figures are in proportion.

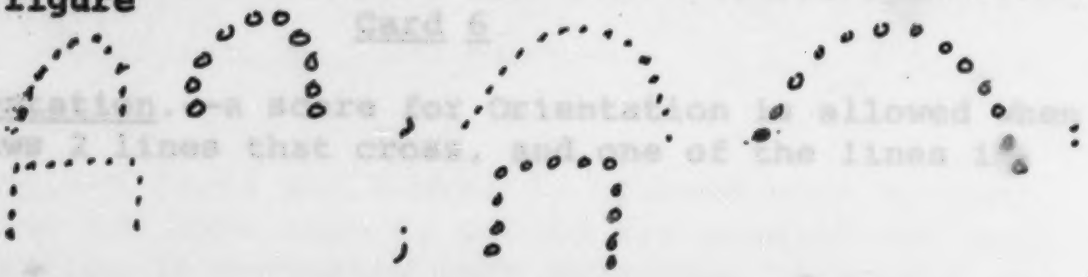


This figure is credited for O, D, N, C but not for G--because the whole percept is out of proportion.

Card 5

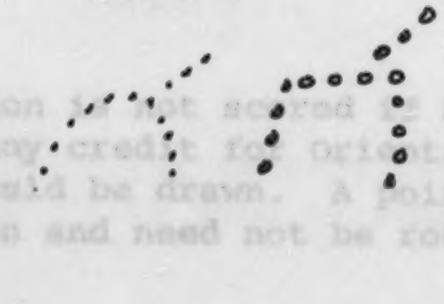
O--Orientation.--Orientation score requires:

1. at least 11 figures (dots, circles, etc.) must be drawn;
2. eight of the figures should appear in an upright, semi-circular, open elipse or 3-sided square-like figure

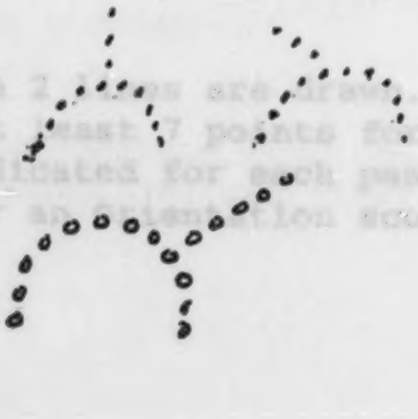


3. at least 3 of the figures must be drawn on top in a straight slanted line a little to the right (off-centered) of the main figure.

Score O



No Score for O

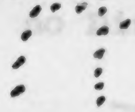


Too far off-center, any angle of slant too large.

D--Distortion.--refer to Distortion requirement for Card 1. Score for Distortion:

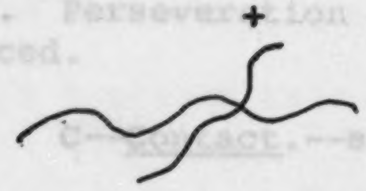
1. when 11 figures are drawn, all must be correct;
2. when 12 to 19 figures are drawn 90 percent of the total should be accurate;
3. when 20 to 25 figures appear, 80 percent of the total amount produced must be correct;
4. when 26 or more figures are drawn, 70 percent of the total amount should be accurate.

N--Number.--to qualify for a Number score, no less than 20 and no more than 32 figures 3 of which should appear in the line part of the drawing, should appear. A production of more than 32 figures reflects perseverative tendencies.

G--Gestalt.--if all of the above categories, Orientation, Distortion, Number, and Contact are correct, allow credit for Gestalt. If the figure is distorted  , even though Orientation, Distortion, Number and Contact are correct, a Gestalt score is not permitted.

Card 6

O--Orientation.--a score for Orientation is allowed when the subject draws 2 lines that cross, and one of the lines is slanted:



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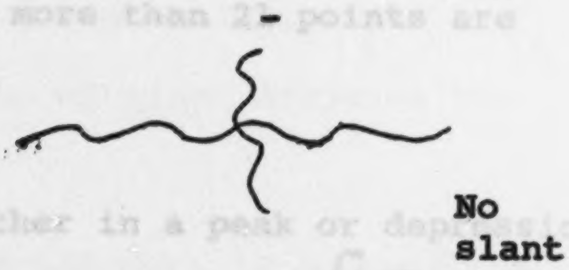
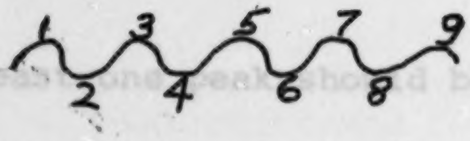
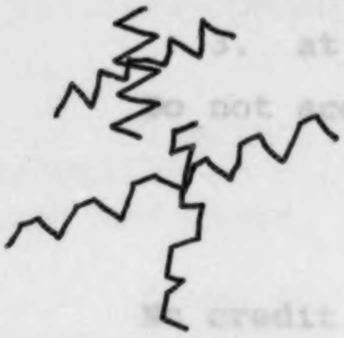
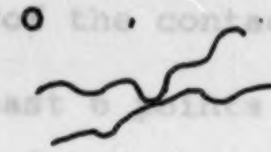
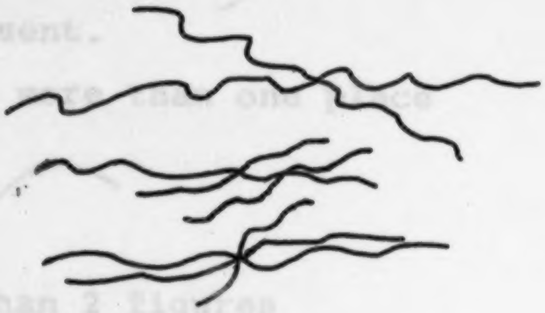
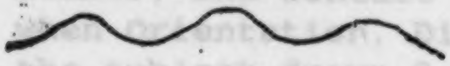
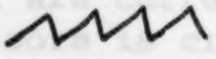
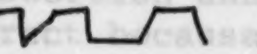
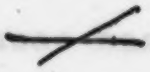
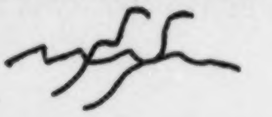
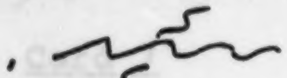
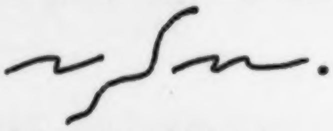


Orientation is not scored if more than 2 lines are drawn. To receive any credit for Orientation, at least 7 points for both lines should be drawn. A point is indicated for each peak and depression and need not be rounded for an Orientation score.

Example of point system: 

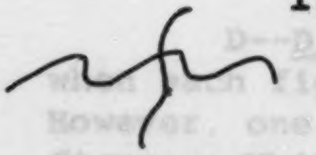
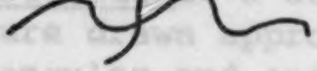
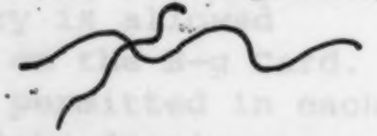
This figure has 9 points

Score for O   No Credit for O 

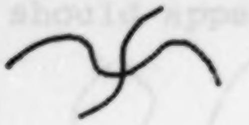
D--Distortion.--to credit for Distortion, both lines must be rounded:  . When more than 4 jagged  or square-like peaks  appear, no Distortion score is given. When lines are drawn straight  without peaks, no Distortion score is permitted. Broken or added lines in both the vertical and horizontal figure do not receive credit for Distortion:  ,  ,  .

N--Number.--a score for Number is allowed when no less than 13 points and not more than 21 points are present for both lines. Perseveration is indicated when more than 21 points are produced.

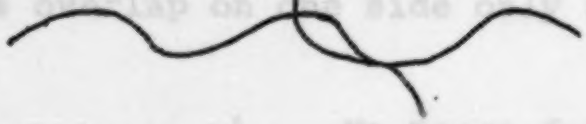
C--Contact.--score for Contact:

1. when the lines come together in a peak or depression   not in a slope  .

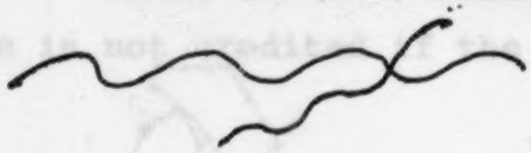
For Contact the lines can deviate from roundness so long as peaks and depressions are clear;

2. when at least one peak should be present on either side of the contact point of one line  ;
3. at least 6 points should be present.

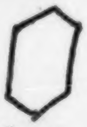
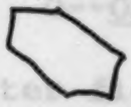
Do not score for C when lines touch in more than one place



No credit is allowed for C when more than 2 figures appear.

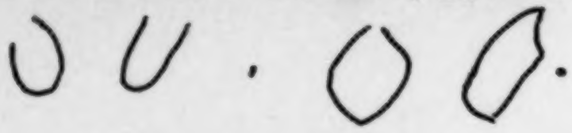
G--Gestalt.--when all 4 categories, Orientation, Distortion, Number, and Contact are credited, a Gestalt score is allowed. But when Orientation, Distortion, Number, and Contact are correct, but the subject draws 2 unrounded peaks, no Gestalt score is credited. When Orientation, Distortion and Number are accurately produced but Contact is incorrect because the line crosses on a slope, score Gestalt, because basic Gestalt is still intact. 

Card 7

O--Orientation.--credit for Orientation is permitted when both figures appear tilted. No score for Orientation is allowed when the figure on the right is drawn upright  without a slight tilt, and when the angle of slant deviates too much  .

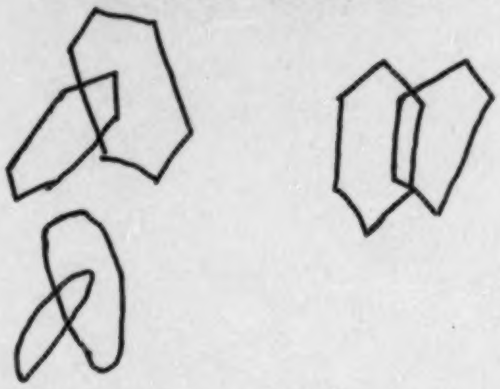
D--Distortion.--a score for this category is allowed when each figure drawn approximates the figures on the B-g Card. However, one angular and one line distortion is permitted in each figure. While a total of 4 errors for the complete drawing are allowed, no more than 2 for each figure are permitted (1 error in one figure and 3 in another, totaling 4, are not allowed).

N--Number.--to qualify for a Number score, 2 figures irrespective of Orientation, Distortion and Contact, should appear.

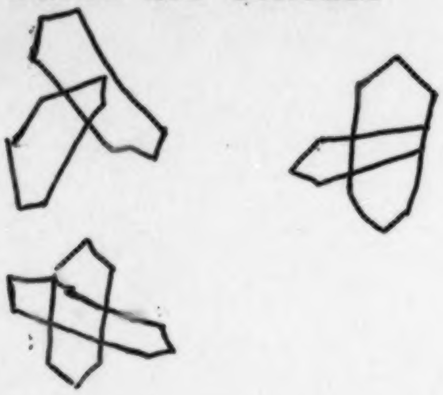
A slightly opened figure is tolerated 

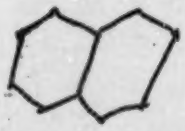
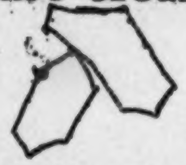
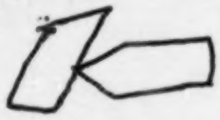
C--Contact.--a score for Contact is given when the boundaries of both figures overlap on one side only and do not reach the other.

Score for Contact



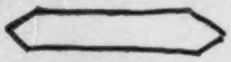
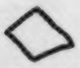
No Score for Contact



Contact score is not credited if the figures touch on the surface  ,  ,  .

G--Gestalt.--to receive credit for Gestalt, Orientation, Distortion, Number, and Contact must be correct.

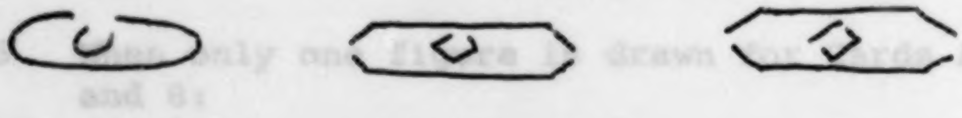
Card 8

O--Orientation.--a score for Orientation is allowed when the outer figure  is drawn parallel to the base of the page. The inner figure  does not influence the Orientation score. A light angular deviation of the base line is tolerated.

D--Distortion.--a score for Distortion is credited when the figures drawn are similar to those on the B-g card. Only one line or angle error is permitted.

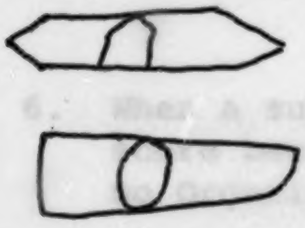
N--Number.--criteria for scoring this category are the same as for Card 7:

Score for Number

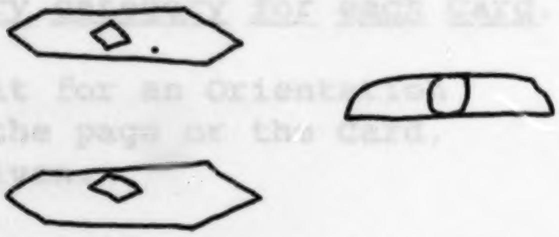


C--Contact.--to obtain a score for Contact, one vertex of the inner figure must touch (at one point) the inner surface of the outer figure, and some surface contact must be made on the opposite side:

Score for Contact

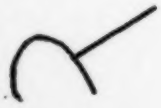


No Score for Contact



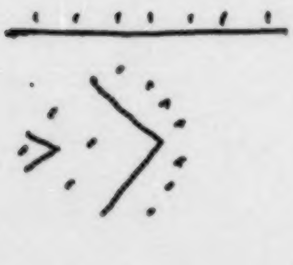
G--Gestalt.--a score for Gestalt is allowed when Orientation, Distortion, Number, and Contact are drawn correctly. However, if D is credited, despite one error in line or angle production, a Gestalt score is not allowed.

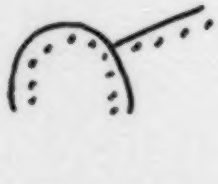
Additional Criteria

1. When S draws for Card 5 the following, 

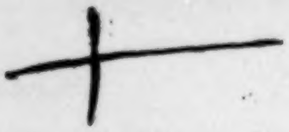
   using a solid line, score zero in every category.

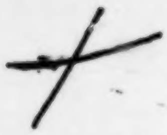
2. When S uses a guide line for Cards 1, 2, 3, and 5, although Orientation, Distortion, Number, and Contact may be correct, no Gestalt score is allowed:





3. When two straight lines are drawn for Card 6, score zero in every category;





4. The appearance of a single row of figures in Card 2 is scored zero in every category.

5. When only one figure is drawn for Cards A, 4, 5, 7, and 8:

   1 line for Card 6,

   6 dots, circles, etc., or less for Card 1,

   9 dots, circles, etc., or less for Card 2,

   7 figures or less for Card 3,

   score zero in every category for each Card.

6. When a subject receives credit for an Orientation score because he has turned the page or the Card, no Organizational score is given.

7. No Organization score is given if one or more cards receives a total score of zero.

8. When a figure drawn is so distorted that it doesn't bear the slightest resemblance to the original, score zero for all categories.

APPENDIX B

AUDIOLOGY AND SPEECH PATHOLOGY EXAMINATION PROCEDURES, ORAL-PERIPHERAL MECHANISM, AND LANGUAGE CRITERIA

EXAMINATION PROCEDURES

Auditory Disturbances

1. Auditory Recognition

Materials: Twelve picture cards, two picture cards with six pictures each (called Figure 1 and Figure 2).

Say: I'm going to say the name of some objects. Point to the object that I name.

Procedure: Place Figure 1 in front of the child. Explain that he is to point to the object you name. In testing, speak only the given word. Repeat procedure with Figure 2.

Figure 1	Figure 2
ball	boy
boat	house
chair	airplane
car	tree
horse	rabbit
flower	dog

2. Auditory Retention Span

Materials: The words and sentences below.

Say: Listen carefully and say just what I say.

Procedure: Underline words misprounced, draw a circle around words omitted, write in any words which are added or substituted. Repeat if child requests it, but score as an error.

a. train

b. snowball

c. salt and pepper

d. Please stand up.

e. Will you answer the doorbell?

f. It is fun to slide down the hill.

g. I like to watch television at night.

h. That little boy likes his milk and crackers.

i. Where are your mother and father going today?

j. Father took me to the movies while Mother was having her hair done.

3. **Following Directions**

Materials: bell, rubber ball, cup, spoon, toy telephone, box, horse, cowboy figure, Indian figure, crayon, pad of paper.

a. Ring the bell.
b. Catch the ball.
c. Put the ball into the cup.
d. Put the horse into the box.
e. Bounce the ball three times.
f. Move the Indian next to the cowboy.
g. Pick up the telephone and say, "Hello!"
h. Put the spoon between the cup and the ball.
i. Place the car on the table and push it to me.
j. Pick up the crayon, draw a line on the paper, and put the crayon back in the box.

4. **Following a Paragraph**

Say: I am going to tell you a story. Listen carefully because when I finish, I will ask you some questions. Are you ready?

Mary worked for her mother all morning. At lunch, she was too tired to eat. When Jane went to see Mary, she found her asleep.

a. What did Mary do all morning?
b. When was she too tired to eat?
c. Who found Mary asleep?

5. **Following a Story**

Say: I am going to tell you a longer story. Listen, and when I finish, you tell the story back to me. Are you ready?

A big brown cat ran away from home. She went with two other cats. It began to rain. They went under a tree and got all wet. They were glad to get home.

Procedure: The child's story is copied verbatim.

Visual Disturbances

1. Matching Picture with Picture

Materials: The twelve small cards and the two large cards used in Auditory Recognition.

Say: Match these pictures with a picture on the card.

Procedure: The child will have Figure 1. The examiner will present one of the single cards to him. The time taken by the child will be recorded with a stop watch and errors will be noted. Repeat with Figure 2.

2. Matching Letter with Letter

Materials: Thirty letter cards with a letter on each, and five larger cards with six letters each as below.

Say: Match this letter with a letter on your card.

Procedure: The child will have Card 1. The examiner will present the corresponding letter cards. Time will be recorded with a stop watch; errors will be noted.

W	F	O	t	n
N	E	G	p	u
V	B	C	d	r
M	K	Q	f	h
L	P	D	b	c
J	R	A	q	e

3. Matching Number with Number

Materials: Twelve number cards and two number cards with six of the numbers each as below.

Say: Match these numbers with a number on your card.

Procedure: The child will have Card 1. The examiner will present the corresponding number cards. The time taken will be recorded with a stop watch; errors will be noted. The same procedure will be used with Card 2.

8	9
36	24
14	58
720	637
957	160

4. Matching Word with Picture

Materials: Twelve word cards (primer type), Figures 1 and 2 used in Auditory Recognition.

Say: Match this word with one of the pictures on your card.

Procedure: The child will have Figure 1. The examiner will present the corresponding set of word cards. Time taken will be recorded with a stop watch; errors will be noted. The same procedure will be followed for Figure 2.

5. Matching Sentence with Sentence

Materials: Twelve sentence cards and two larger cards with six sentences each.

Say: Match these sentences with a sentence on the card. DO NOT READ THE SENTENCE.

Procedure: The child will have Card 1. The examiner will present the twelve sentence cards, one at a time. The time taken will be recorded with a stop watch; errors will be noted. The procedure will be repeated with Card 2.

a. Father is reading my pretty books.
b. The boys are kicking the football.
c. Susan gave me some filled cookies.
d. He wants to go along to the party.
e. My sister and I like gum and nuts.
f. The cat was playing with the ball.

a. My dog barked and chased the cars.
b. My friends and I are going to run.
c. The pony and the dogs are friends.
d. Dick looked at a book for an hour.
e. Dick and Sally came with us today.
f. Rabbits eat peas and many carrots.

6. Matching a Single Word with a Word in a Sentence

Materials: Three word cards and three sentences on a larger card.

Say: This little word is some place in the sentences on your card. Find it and point to it.

Procedure: The large card is placed in front of the child, and he is handed each of the small cards separately.

to
and
my
The boys and girls have a ball.
He wants to go to my party now.
My friend and I like to go out.

Oral and Peripheral Examination

Materials: Tongue blades, small flashlight, mirror.

Reference: Wendell Johnson, Frederick L. Darley, and D. C. Spriestersbach, Diagnostic Manual in Speech Correction (New York: Harper and Brothers, 1952), pp. 40-44, by permission of the authors.

1. Description of the Size and Shape of the Peripheral Oral Structures

a. Teeth

(1) Class of occlusion

- (a) Normal occlusion
- (b) Neutroclusion
- (c) Distoclusion
- (d) Mesioclusion

(2) Condition of anterior teeth

- (a) Protrusion
- (b) Overjet
- (c) Openbite
- (d) Closebite
- (e) Crossbite
- (f) Edentulous spaces resulting from the absence or loss of teeth
- (g) Lack of proximal contact; lack of contact between any two adjacent teeth
- (h) Misalignment, or malignment; an abnormal position of a tooth in the dental arch
- (i) Jumbling: a piling-up or crossing-over of several teeth
- (j) Supernumerary teeth: teeth in excess of the normal number.

        (3) Missing teeth (describe)
        (4) Other

    b. Soft palate
        (1) Length
        (2) Distance from the posterior wall of the pharynx in the rest position
        (3) Velar asymmetry (describe)
        (4) Condition of uvula

    c. Tongue
        (1) Size (in relation to dental arch)
        (2) Characteristic position of tongue in mouth during rest position
        (3) Size and position of attachments of lingual frenum

    d. Lips
        (1) Thickness
        (2) Contact during rest position
        (3) Adequacy of labial tissue

2. *Description of the Motility of the Peripheral Oral Structures*

    a. Lips
        (1) Protrusion
        (2) Retraction
            (a) Unilaterally
            (b) Bilaterally
        (3) Number of times subject can say *pah* in 5 seconds:
            Trial 1:   Trial 2:   Trial 3:

    b. Tongue
        (1) Maximum protrusion
        (2) Ability to point tongue
        (3) Direction of air stream when making a prologned *s*.
        (4) Number of times subject can touch the corners of his mouth alternately in 10 seconds
        (5) Number of times subject can say *tah* in 5 seconds:
            Trial 1:   Trial 2:   Trial 3:

c. Soft palate and pharyngeal wall

(1) Gag reflex
(2) Ability to blow up a balloon
(3) Ability to drink through a straw
(4) Number of times subject can say kah in 5 seconds:

Trial 1: Trial 2: Trial 3:

Examination of Muscular Control for Speech

Materials: Flashlight, counter, and stop watch.

Reference: Ibid., pp. 53-54.

	Number of Seconds or Time	Error
1. Sustaining steady phonation (10 times)		
2. Opening and closing mouth, mandible, and lips moving together (10 times in 10 seconds)		
3. Opening and closing lips, teeth together (10 times in 10 seconds)		
4. Raising tongue tip to gum ridge, mandible stabilized (10 times in 10 seconds)		
5. Protrude tongue. Score error if tongue deviates from midline at rest.		
6. Moving tongue tip from corner to corner of mouth (10 times in 10 seconds). Score error if lateral movements are unequal.		
7. Open mouth wide. Observe uvula with flashlight. Score error if movements of two sides of soft palate (uvula) deviates from midline at rest.		
8. Say ah five times; observe with flashlight. Score error if palate is not elevated on phonation.		
9. Same as item 8. Score error if movements of two sides of soft palate are unequal on phonation.		

Say: Listen carefully and say just what I say.

Procedure: Each of the words are said once by the examiner.

Lips	Tongue	Palate	Complex Coordinations
1. pie	6. toe	13. key	15. see
2. boy	7. day	14. go	16. shoe
3. me	8. no		17. joy
4. foe	9. lie		18. chew
5. vow	10. row		19. split
	11. they		20. spry
	12. yes		21. street
			22. screw

Articulation Test

Consonants

1. Key to Basic Articulation Test

		Initial	Medial	Final
a.	(p)	pie	apple	pipe
b.	(b)	ball	baby	crib
c.	(t)	table	letter	boat
d.	(d)	dog	ladder	bed
e.	(k)	car	cookies	milk
f.	(g)	gun	wagon	flag
g.	(f)	fish	telephone	knife
h.	(v)	valentine	envelope	glove
i.	(θ)	thumb	birthday cake	mouth
j.	(ð)	this one or that one?	feather	smooth
k.	(s)	soup	bicycle	horse
l.	(z)	zoo	scissors	eyes
m.	(ʃ)	shoe	dishes	fish
n.	(ʒ)		television	garage
o.	(h)	hot dogs	doghouse	
p.	(ʍ)	wheel	black and/or white	
q.	(w)	window	towel	
r.	(j)	yarn	yo-yo	
s.	(r)	ring	mirror	tire

		Initial	Medial	Final
t.	(l)	leaves	umbrella	girl
u.	(m)	monkey	hammer	drum
v.	(n)	nest	banana	train
w.	(ŋ)		swinging	swing
x.	(tʃ)	chair	peaches	watch
y.	(dʒ)	juice	fire engine	orange

2. **Stimulability, Nonsense Syllables**

		Initial	Medial	Final
a.	(p)	(pa)	(apa)	(ap)
b.	(b)	(ba)	(aba)	(ab)
c.	(t)	(ta)	(ata)	(at)
d.	(d)	(di)	(idi)	(id)
e.	(k)	(ka)	(aka)	(ak)
f.	(g)	(ga)	(aga)	(ag)
g.	(f)	(fa)	(afa)	(af)
h.	(v)	(va)	(ava)	(av)
i.	(θ)	(θa)	(aθa)	(aθ)
j.	(ð)	(ða)	(aða)	(að)
k.	(s)	(sa)	(asa)	(os)
l.	(z)	(za)	(aza)	(az)
m.	(ʃ)	(ʃa)	(aʃa)	(aʃ)
n.	(ʒ)		(aʒa)	(aʒ)
o.	(h)	(hɛ)	(ɛhɛ)	
p.	(ʍ)	(ʍɛ)	(ɛʍɛ)	
q.	(w)	(wɛ)	(ɛwɛ)	
r.	(j)	(ja)	(aja)	
s.	(r)	(ri)	(iri)	(ur)
t.	(l)	(li)	(ili)	(il)
u.	(m)	(mɛ)	(ɛmɛ)	(ɛm)
v.	(n)	(neI)	(ɛnɛ)	(eIn)
w.	(ŋ)		(aŋa)	(aŋ)
x.	(tʃ)	(tʃa)	(atʃa)	(atʃ)
y.	(dʒ)	(dʒa)	(adʒa)	(adʒ)

3. Stimulability, Words

		Initial	Medial	Final
a.	(p)	pillow	puppy	cap
b.	(b)	bone	rabbit	web
c.	(t)	toy	buttons	coat
d.	(d)	doll	ready	aid
e.	(k)	cap	cracker	pack
f.	(g)	game	forget	wag
g.	(f)	fire	before	roof
h.	(v)	visit	cover	give
i.	(θ)	thread	healthy	teeth
j.	(ð)	these	mother	breathe
k.	(s)	see	inside	glass
l.	(z)	zebra	easy	nose
m.	(ʃ)	ship	brushes	wish
n.	(ʒ)		measure	rouge
o.	(h)	hair	behind	
p.	(ʍ)	whistle	anywhere	
q.	(w)	we	bow-wow	
r.	(j)	yes	onions	
s.	(r)	rabbit	carry	for
t.	(l)	look	balloon	tall
u.	(m)	moon	lemon	gum
v.	(n)	no	bunny	can
w.	(ŋ)		singing	tongue
x.	(tʃ)	chicken	kitchen	catch
y.	(dʒ)	jelly	bridges	sponge

Vowels and Diphthongs

1. Key to Basic Articulation Test

a.	(i)	tree
b.	(I)	kittens
c.	(ɛ)	eggs
d.	(ae)	sandwich
e.	(^)	truck
f.	(a)	star
g.	(ɔ)	coffee
h.	(U)	book
i.	(u)	ruler
j.	(ju)	music
k.	(oU)	toast

l.	(aU)	flowers
m	(eI)	cake
n.	(aI)	tie
c.	(ɔI)	boy

2. **Stimulability, Nonsense Syllables**

a.	(i)	(li)
b.	(I)	(IdI)
c.	(Ɛ)	(Ɛk)
d.	(ae)	(gaef)
e.	(ʌ)	(sʌg)
f.	(a)	(ba)
g.	(ɔ)	(gɔb)
h.	(U)	(lUd)
i.	(u)	(fur)
j.	(ju)	(pjub)
k.	(oU)	(koUf)
l.	(aU)	(daUl)
m.	(eI)	(beIn)
n.	(aI)	(kaI)
o.	(ɔI)	(fɔI)

3. **Stimulability, Words**

a.	(i)	see
b.	(I)	big
c.	(Ɛ)	edge
d.	(ae)	catching
e.	(ʌ)	fun
f.	(a)	far
g.	(ɔ)	talking
h.	(U)	would
i.	(u)	moon
j.	(ju)	cute
k.	(aU)	clowning
l.	(oU)	boat
m.	(oI)	mail
n.	(aI)	my
o.	(ɔI)	toy

Blends

1. **Key to Basic Articulation Test**

a.	(st)	stove
b.	(sp)	spoon
c.	(sk)	school
d.	(sm)	smoke
e.	(sn)	snowman
f.	(sl)	sled
g.	(ns)	pencil
h.	(ts)	cats
i.	(br)	bread
j.	(dr)	dress
k.	(tr)	train
l.	(kr)	ice cream cone
m.	(gr)	grass
n.	(rd)	card
o.	(rt)	heart
p.	(rn)	corn
q.	(pl)	airplane
r.	(rk)	fork
s.	(kl)	clock
t.	(lk)	milk
u.	(ld)	gold
v.	(lt)	belt

2. **Stimulability, Nonsense Syllables**

a.	(st)	(sta)
b.	(sp)	(spa)
c.	(sk)	(ska)
d.	(sm)	(sma)
e.	(sn)	(sna)
f.	(sl)	(sla)
g.	(ns)	(ansa)
h.	(ts)	(ats)
i.	(br)	(broU)
j.	(dr)	(draU)
k.	(tr)	(tra)
l.	(kr)	(kra)
m.	(gr)	(gra)
n.	(rd)	(aIrd)
o.	(rt)	(irt)
p.	(rn)	(urn)
q.	(pl)	(pla)

r.	(rk)	(urk)
s.	(kl)	(kla)
t.	(lk)	(alk)
u.	(ld)	(æ ld)
v.	(lt)	(aIlt)

3. **Stimulability, Words**

a.	(st)	step
b.	(sp)	spell
c.	(sk)	skate
d.	(sm)	smile
e.	(sn)	sneezing
f.	(sl)	slide
g.	(ns)	answer
h.	(ts)	eats
i.	(br)	bring
j.	(dr)	draw
k.	(tr)	track
l.	(kr)	crayon
m.	(gr)	grand
n.	(rd)	bird
o.	(rt)	part
p.	(rn)	barn
q.	(pl)	plum
r.	(rk)	work
s.	(kl)	clean
t.	(lk)	silk
u.	(ld)	called
v.	(lt)	melt

Eliciting Children's Connected Speech

1. General. Elicit and record verbatim for analysis at least 50 utterances (not necessarily consecutive) from each child tested.

2. Materials. The speech sample will be elicited alone with the child. The following materials will be used:

   a. With primary and intermediate age children:

      (1) A set of cowboys and Indians in all fighting postures
      (2) A set of toy vinyl animals
         (a) Chickens--chicks
         (b) Sheep--lambs
         (c) Cows--calves

- (d) Horses--colts
- (e) Ducks--ducklings
- (f) Donkeys--baby donkeys
- (g) Turkeys
- (h) Pigs--piglets

(3) One toy stage coach
(4) One toy peddler's wagon
(5) Three cards of cats who squeak
(6) One toy mouse which moves when wound
(7) One cowboy and horse, the cowboy with lasso ready to throw, one long rifle, one revolver, and a hatchet
(8) Two colored balls
(9) One small red car
(10) A bell
(11) A small toy telephone
(12) The following picture books:

- (a) Life situation pictures, Alice Hanson, Hello (Racine, Wisconsin: Whitman Publishing Company, 1955),
- (b) Life situation pictures, Betty Ren Wright, My Big Book (Racine, Wisconsin: Whitman Publishing Co., 1954),
- (c) Animal pictures, Garth Williams, The Golden Animal, A-B-C (New York: Simon and Schuster, 1954),
- (d) Animal pictures, William P. Gottlieb, Farmyard Friends (New York: Simon and Schuster, 1956).

b. Stimulus pictures used with junior and senior high age children:

(1) Girls only

- (a) A picture of a pajama party, the girls doing their hair, putting on make-up, playing records, drinking soft drinks,
- (b) A girl speaking to a boy on the telephone, girl is dressed in slacks, has feet upraised,
- (c) A woman showing a man some material for an interior decorating plan, woman standing, man sitting and smiling,
- (d) A girl with a dance book crying on the bed, older woman comforting her,
- (e) A picture of one couple on the beach waving to people in a boat,
- (f) Two couples on the beach, one couple running to the other couple sitting on the sand, sailboat in background.

(2) Boys and girls

  (a) A man playing an organ and singing, son and daughter watching happily, woman bringing in refreshments (Mother),
  (b) A boy and a girl arguing, girl full face, boy with his back to the camera, bicycle in background,
  (c) A man helping a woman with her dropped packages, her purse open, her dog (a poodle) is looking at a boxer, amused passer-by,
  (d) A rabbit in a cage, his ears drooping,
  (e) A superhighway on three levels, a man and two women watching the cars,
  (f) A "car of the future" operated by remote control, family playing dominoes,
  (g) A man arguing with another man, counting points on his fingers,
  (h) A woman in a car bringing a boy and a girl to school, children in background looking up at a plane,
  (i) A woman reading a letter in a modern living room,
  (j) A dinner party, one of the four (a woman) talking, others listening,
  (k) A man, wife, two little girls, picking out colors for interior decorating, all smiling
  (l) A woman admiring a clean white shirt.

(3) Boys only

  (a) A contractor checking his blueprints against the construction,
  (b) An Arab with his gun loaded, looking hostile, falcon near him.

3. Procedure

a. For primary and intermediate age children, the children are told (61):

"I want you to take these toys out of the boxes and play with them any way you like, just as you would if you were at home by yourself. But you must tell me just what you are doing while you play, so I will know."

b. For junior and senior high age children:

"This picture tells a story. Look at the picture and tell me all about it."

4. Recording the Remarks. After the first ten utterances, the next 50 remarks are recorded verbatim. If the examiner says anything to elicit a response, that is recorded.

SCALE OF THE ORAL-PERIPHERAL MECHANISM

1	2	3	4	5
Occlusion Neutroclusion or almost occlusion	Occlusion Slight mesioclusion or distoclusion	Occlusion Moderate degree of mesioclusion or distoclusion	Occlusion Severe mesioclusion or distoclusion	Occlusion Very severe mesioclusion or distoclusion
Teeth Teeth normal	Teeth Teeth slightly deviant	Teeth Incisors, bicuspids, or first molars missing or deviant	Teeth Teeth severely deviant (Example: upper incisors severely jumbled)	Teeth Teeth very severely deviant (Example: incisors and bicuspids missing
Tongue Tongue normal	Tongue Tongue movement basically normal--some deviation (Example: unequal side to side movement)	Tongue Tongue movement moderately abnormal (Example: cannot point tongue)	Tongue Tongue severely deviant (Example: remains at bottom)	Tongue Tongue very severely deviant (Example: too thick a frenum to permit movement) (Example: consistent movement to one side)
Velum Velum normal	Velum Velum slightly deviant	Velum Velum moderately deviant (one side of velum raised higher than the other)	Velum Velum severely deviant (Example: raised very slightly on stimulation)	Velum Velum very severely deviant (nasality apparent--very little function of velum_

LANGUAGE CRITERIA

A. Rules for Counting Number of Words

1. Contractions of subject and predicate like "it's" and "we're" are counted as two words.

2. Contractions of the verb and the negative such as "can't" are counted as one word.

3. Each part of a verbal combination is counted as a separate word; thus, "have been playing" is counted as three words.

4. Hyphenated and compound nouns are one word.

5. Expressions which function as a unit in the child's understanding were counted as one word. Thus, "Oh boy," "all right," etc., were counted as one word, while "Christmas tree" was counted as two words (28).

B. Classification of Sentence Structure. The following terms have been amplified by Davis (28) after McCarthy (61):

1. Functionally complete but structurally incomplete. This includes naming; answers in which omitted words are implied because they were expressed in the question; expletives; and other remarks, incomplete in themselves, which are clearly a continuation of the preceding remark.

2. Elaborated sentence; simple sentence with two or more phrases, or compound subject, or predicate and phrase (28); complex sentence with more than one subordinate clause, or with a phrase or phrases (28); compound sentence with more than two independent clauses, or with a subordinate clause or phrases (61).

APPENDIX C

SOCIAL WORKERS' CASE HISTORY MATERIALS

IDENTIFICATION SHEET

Family Name____________________ Address____________________ Date Recorded____________

Individual Name	Sex	Date of Birth	Place of Birth	Educational Background	Occupation
Mother's					
Father's					
Child's					
Siblings					
Others in the home					

Please print or type. Answer all questions in this history to the best of your knowledge.

1. **Child's name________________ ________________ ________________**
   Last First Middle
2. **Address________________________ ________________**
   Street City or Town
3. **Telephone number________________________________**
4. **Date of child's birth____________________ Present age______**
5. **School he is attending____________________ ________________**
   Name Address
6. **School grade or name of class____________________________**
7. **Mother's maiden name____________________ ________________**
   First Last
8. **Mother's birthdate ________________________________**
9. **Father's first name ________________________________**
10. **Father's birthdate ________________________________**
11. **Names and Birthdates of all brothers and sisters of child**

    ____

    ____

    ____
12. **Do any of the above people mentioned in questions 7 through 11 have any chronic health conditions? If so, please state diagnosis next to the name.**

Mother's Medical History During Pregnancy

1. **Total number of pregnancies____________________**
   a. **Total number of miscarriages________________**
2. **Child was________________Pregnancy.**
3. **During what month did you begin prenatal care?________________**

4. Did you have any of the following? (Please answer "yes" or "no." If answer is "yes" please state during what month, type of treatment, and how long condition lasted. If condition recurred, state how often.)

   a. Convulsions or epileptic____________________

   b. Virus infection____________________

   c. German measles____________________

   d. Bleeding____________________

   e. Measles____________________

   f. Other illnesses____________________

5. Did you have any of the following? (Please answer "yes" or "no." If answer is "yes" please describe.)

   a. Accidents____________________

   b. Unusual worries or emotional strain____________________

   c. Unusual physical strain____________________

6. Did you have a healthful fiet during the pregnancy? (If answer is "no," please state what diet included.)

7. Were you on a special diet? (If answer is "yes," please describe the diet and explain the reason.)

8. Did you have any medication during pregnancy? (If so, give name, if known.)____________________

9. Results of RH Factor test if one was done____________________

10. Hospital where baby was born

____________________	____________________	____________________
Street	City	State

Obstetrical History

1. Length of pregnancy____________Length of active labor______
2. Type of delivery. (Please check one.)
   Spontaneous____________Forceps____________Caesarean______
3. Abnormalities or injuries________________________________
4. Weight of child at birth____________lbs.____________ozs.
5. How soon after delivery did you first see the child?
   ____

Appearance of Child at Birth

Please answer "yes" "no" or "unknown." If answer is "yes", please state how long condition lasted from ahe time of birth and the type of treatment the child received.

1. Did the baby appear yellow?________________________
2. Did the baby have any difficulty breathing?____________
3. Did the baby have blue lips?________________________
4. Did the baby have convulsions?______________________

Family Medical History

Please answer "yes" or "no" for the following. If the answer is "no," please give the nature of the illness. If the person is deceased, give cause of death and age at time of death.

1. Is mother's mother living and well?__________________
2. Is mother's father living and well?__________________
3. Is father's mother living and well?__________________
4. Is father's father living and well?__________________
5. Are all of mother's brothers and sisters living and well?_____
6. Are all of father's brothers and sisters living and well?_____

7. Have any members of the family (that is, child's parents, grandparents, uncles, aunts, brothers or sisters) had any of the following? (Only answer if it is not covered by Questions 1 through 6 above. If answer is "yes" please state age of person when condition occurred and the relationship of the person to the child.)

    a. Epilepsy____
    b. Nervous breakdown________________________________
    c. Hospitalization for mental illness__________________
    d. Convulsions______________________________________
    e. Heart disease____________________________________
    f. Syphilis____
    g. Tuberculosis_____________________________________
    h. Diabetes____
    i. Cancer____
    j. Mental deficiency________________________________

Developmental History of the Child

1. Infant feeding

    a. Breast____________________
    b. Weaned at__________months.
    c. Other_____________________

2. Please give the age at which the child did the following. If you do not recall the exact age, give the approximate age.

    a. Balanced head______________
    b. Sat unsupported____________
    c. Rolled over alone__________
    d. Moved about on floor_______
    e. Stood alone________________
    f. Walked about room alone___
    g. "Talked" imitated sounds__
    h. Talked in short sentences_
    i. Reached for familiar persons___
    j. Noticed noises_________________
    k. Played with hands______________
    l. Followed objects with eyes_____
    m. Followed simple instructions___
    n. First teethed__________________
    o. First ate alone with spoon_____
    p. Started counting_______________

q. What causes him physical pain?______________________________

r. Does your child tell you when:

cold__________________

in pain_______________

annoyed by odors_____

3. Toilet training

a. Is child bladder______________, bowel______________trained?

b. At what age was child bladder trained?______________________

Was this complete____________________or partial______________?

c. At what age was child bowel trained?________________________

Was this complete____________________or partial______________?

d. When does your child show discomfort?_______________________

4. Please list all usual childhood diseases child has had and the ages at which they occurred. Were there any irregularities?

5. Please list all major illnesses child has had and the ages at which they occurred. If child was hospitalized for any of these, please give name and address of hospital. Were there any irregularities?

6. Please list all serious accidents child has had and the ages at which they occurred. If child was hospitalized for any of these, please give the name and address of hospital. Were there any irregularities?

7. Please list all operations child has had and ages at which they were performed. Please give name and address of hospital with the exception of the tonsillectomy. Were there any irregularities?

8. **Please give description of all unusual behavior complaints of the child. Please state how he gets along with his brothers and sisters, father, mother, other children, other adults.**

9. **Is your child afraid of anything?**

10. **Was your child ever afraid? What types of fears did he have? How often did these fears appear? How were they overcome?**

11. **Please describe the child's interests, how he amuses himself or occupies his time.**

12. **Please describe your child's speech and how he lets others know what he wants.**

13. **Please describe any nervous mannerisms the child may have, such as stuttering, tics, etc.**

14. **Habits**

   a. **Appetite**____

   b. **Sleep**____

   c. **Bowels**____

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p 180

History of Present Condition

1. Please describe what it was about your child that first made you feel that he was having difficulty with his development? Give age of child when this occurred.

2. Please state in story form, as each occurred, the sequence of events from the time it was first noticed that your child was retarded. This includes his particular retarded development in any form, if any treatment or consultations were sought, if any tests or medications were given, any serious illnesses etc. In general, the entire story of the orignial onset of his retardation up to the present time. Please include (1) the names and addresses of physicians who treated the child for his retardation; (2) clinics and hospitals where he was examined; (3) the diagnosis you were given by each; (4) age of child when he was under the care of each, and (5) the kinds of work-ups (for example, X rays, blood tests, maedications, etc.) the child was given by each.

(Please use the other side of this paper, if necessary)

Date:________________________ ____

Signature of person filling out form

FAMILY CASE HISTORY

I. Home and Environment

A. Descriptions

1. Neighborhood
2. Physical Aspects
3. Person or persons interviewed--apparent characteristics

II. Background

A. Early History (Husband and wife separately) (Place of birth--identification sheet)

1. Early childhood-health environment
2. Education--reasons left school, etc., age, grade, choice, why?
3. Education of parents--child's grandparents
4. Employment history--positions--first position--reasons for changes
5. Socio-economic status

B. History of Married Life

1. How they met--date and place of marriage
2. Work after marriage--man and wife
3. Own home? Furniture, etc.?
4. Parents avocational and recreational activities, interests, etc.
5. Geographical stability
    - a. Number of times moved, when, where, how far
6. Health

C. Children (History same as man and wife)

1. Condition--physical, mental, and moral
2. School-aims and aptitudes--descriptions under school experience
3. Recreation
4. Developmental history
    a. Physical--walking, toilet training, teething, puberty
    b. Speech socialization--talking
    c. Coordination of movements--held head erect
    d. Special sensations--smells, see, hear, organic senses, pain, cold, hunger, discomfort

5. Siblings
    a. Interaction between siblings and mental retardate
    b. Siblings' feelings toward mental retardate
    c. Retardate feelings toward siblings
6. Miscarriages, deaths
7. Were siblings and retardate planned children?

III. Special Experiences of Retardate

A. Traumatic--Rage or tantrums?

1. Physical

a. Prenatal trauma

b. Birth (normal type)

c. Diseases--when and type

(1) Any irregularities in nature of disease or accident in period or recovery

(2) Epileptic or convulsions

(3) Sleep walking

(4) Nervous disorders

d. Accidents--when and type

2. Psychological

a. Past fears--type and duration--when they appear and how they were overcome

3. Pre-school experience

a. Informal--parent teaching child--to read, count, speak, etc.

b. Formal--nursery school, private teacher, music lessons

4. School experience
    - a. Age entered school, public or private
    - b. Age entered grade school
    - c. Any difficulties or positive accomplishments at school
    - d. Regular or irregular attendance
    - e. Ability--special aptitudes
    - f. How does child feel about school parent?

IV. Parental Attitudes

A. Retardate feelings

1. Toward mental retardate (in general)
2. Toward their mentally retarded child
3. Toward other children (normal-nonretardate)
4. Toward their other children (normal, if any)

5. Identification with either parent--as far as speech. May not identify with speaking parent.

B. Awareness--first knowledge of child's mental retardation

   1. How
   2. When
   3. Feelings at first knowledge

C. Changes in social life--of parents and siblings since birth of retardate--more or less socialization and nature of it

D. Changes in social life from moving

   1. Feelings of parents, retardate, siblings to moving
   2. Nature of adjustment to moving

3. Effect of new community on socialization process because of mental retardate

E. Special attitudes

Arising from interview on emotions and sympathies. Are parents in agreement?

F. Aspirations--future plans

1. of parents
2. of siblings
3. of retardate
4. of parents for siblings
5. of parents for retardates

G. Evaluation

  1. Clients attempt to combat difficulty

    a. attitude

    b. plan

    c. resources

    d. problems presented

      (1) social

      (2) physical

      (3) economic

      (4) psychological

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